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Firm and Product Age Distributions of Selected Growth Manufacturing Industries in the Prairies

by

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This thesis is dedicated to my father

Abstract

This study identifies the development phases (based on the age of firms and their products) of prairie manufacturing firms in regional and metropolitan centres. The main focus, however, lies in understanding the locational and investment characteristics associated with each development phase. Analyses of data gathered from interviews with 197 firms reveal that by age measured in years since the date of establishment, firms are predominantly young. When the age of firms is examined in association with the age of their major products, as measured by the date since they were first marketed, then it is clear that prairie firms have been created at various phases of the product cycle. The major development phases are young firms with mature products, young firms with old products, mature firms with mature products and mature firms with old products. For the prairies as a whole, the predominant phase consists of young firms with mature products.

The investigation reveals that young firms with young products are not attracted to the regional centres. Such centres have a proportionately higher number of branch operations and firms with old products than the metropolitan centres.

The development phases are associated with a large number of growth strategies; the most common in order of importance are internal diversification into related

products, different markets and unrelated products. The development phase consisting of mature firms with mature products is particularly associated with the adoption of more than five growth strategies. This phase is also associated with a high degree of patenting. Innovation as a diversification measure, is significantly associated with young firm/mature product in the metropolitan centres, although the type of innovation generated made little or no change to current technology. Government industrial incentive programmes are also influential on the growth strategies of the firms, especially the mature firms with old products. The programmes aid their innovation processes, production and labour requirements.

The growth strategies have a spatial orientation which is illustrated by the market diversification and the establishment of branch plants. Although location decisions are important at any development phase, mature firms with mature products are more likely to make decisions on relocation, branch phants, acquisition and merger for reasons based on the availability of government incentives and the efficiency of the building.

In implementing growth strategies, the firms in each development phase face numerous problems, most of which are centred on the labour market and uncertainty over government policy. The young firms with mature products in the metropolitan centres are statistically associated with these problems. Lack of borrowing power, low market growth, high

cost of land and technological obsolescence are associated with the young firms (old products) in the regional centres.

The complete set of findings permits speculation that the identification of firm development phases could be a pervasive variable in formulating industrial development policy decisions particularly in peripheral regions. The discussion of the implication of the findings focuses on the significance of attracting or encouraging firm initiation at the early stage of a product cycle.

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Table of Contents

Chapter Page

I. INTRODUCTION 1

A. Purpose 1

B. Scope of the Study 3

C. Relevant Concepts 4

The product life cycle 4

D. Filtering-Down Theory 8

Implication of Concepts 9

E. Framework of Analysis 10

F. Propositions to be Tested 12

G. Plan of Work 14

II. APPROACHES TO FIRM BEHAVIOUR 16

A. Theory of the Firm: Non-spatial Approach 16

The traditional theory of the firm 16

Behavioural approach 19

Theory of the Growth of the firm 20

B. Firm Behaviour and Location Theory 25

C. Behavioural Approach and Location Theory 29

D. Development Phases and Manufacturing Change ..31

Introduction 31

The Birth of a Manufacturing Firm 34

Firm Development 43

Firm Development and Location Decisions ...45

III. CHARACTERISTICS OF PRAIRIE MANUFACTURING 53

A. Introduction 53

B. Periphery-Centre Relationships 53
Labour Advantages 56
Agglomeration Diseconomies 59
Natural Resources 60
Innovation 62
Government regional policy 67
C. Prairie Centre and Periphery Relationships ...70
Market Accessibility/Potential 70
The Multiplier 72
Economies of Scale 74
Labour Advantages 77
Transport Facilities 79
Provincial Government Policies 81
Conclusion 83
D. Prairie Studies 85
E. Aspects of Prairie Manufacturing 87
F. Change Differentials in Selected Manufacturing Industries 91
Summary 97
IV. METHODOLOGY 99
Research Hypotheses and Data Requirements 103
Sample Design 109
A. Questionnaire Design 114
B. Questionnaire Structure - Appendices B and C 116
The Interview Schedule 116
The Call-Back Questionnaire Schedule 117
C. Response to the Survey 119

D. Statistical Methods 120

V. DATA ANALYSIS 124

A. Firm and Product Classifications 124

Firm Classification 124

Product Classification 126

The Firm and the Product Life Cycle Classifications 127

B. Initial Location Factors 129

Development Phases and Initial Location Factors 132

Experience of Respondents in Manufacturing 132

Development phase and experience in manufacturing 134

Ownership Structure 134

Development phase and ownership structure 135

Initial Industry 135

Development phase and initial industry ...136

C. Strategies for Growth 136

Objectives of a firm 137

Development Phase and Goals 139

Strategies 140

Scale factors 152

Development Phases and Strategies 155

Scale Variables and Development Phase 163

Summary of the Strategies for Growth by Prairie Firms 169

D. Attitude and Experience in Research and Development 172

Characteristics of Innovation 172

Development phase and invention 174

Development phase and types of innovation 174

Sources of Innovation 176

Organization of R & D 177

Development phase and research and development 178

Effects of innovation on firm development 178

Views expressed on innovation 183

E. Government Programmes 187

Development phase and government programmes 193

Development phase and effect of government programmes 194

F. Location Decisions 195

Development phase and location decisions .195

Relocation 196

Branch Plants 197

Acquisition/Merger 198

Expansion-in-situ 199

A summary of the association between the location decision variables and the development phase controlling variables ..200

G. Constraints On Growth and Development 203

A note on the response to possible relocation as a result of constraints on growth in existing locations 207

H. A Model of Firm Behaviour at Different Development Phases in a Peripheral Location .209

VI. SUMMARY, CONCLUSIONS AND IMPLICATIONS 218

A. Summary of the Analysis 218

B. Questions and Hypotheses 225

Questions 225

Hypotheses 229

C. Implications and Recommendations 234

D. Theoretical Considerations and Suggestions for Future Research 240

Figures 246

Tables 254

Bibliography 383

Appendix A 397

Appendix B 403

Appendix C 425

Appendix D 430

Appendix E 431

List of Tables

1 - Characteristics of the product life cycle according to Hirsch 254

2 - Percentage rate of change of manufacturing hourly earnings 1960-1980 (urban centres) 255

3 - Agricultural implements:Regression Results of Selected Variables and Year 256

4 - Machine shops; Regression results of selected variables and year 257

5 - Ornamental and Architectural: Regression results of selected variables and year 258

6 - Metal Door: Regression results of selected variables and year 259

7 - Fabricated Structural Metal: Regression results of selected variables and year 260

8 - Fabricated Metal Building: Regression results of selected variables and year 261

9 - Miscellaneous Metal: Regression results of selected variables and year 262

10 - Metal Stamping: Regression results of selected variables and year 263

10b - Metal Stamping n.e.s: Regression results of selected variables and year 264

11 - Distribution of frim population (innovators and non-innovators) and firm sample 265

12 - Distribution of sampled firm by individual centre, centre groupings and prairie 266

13 - Date of establishment 267

14 - Multiple response analysis on product age 269

15 - Multiple response analysis on product age/firm age .272

16 - Reclassified age groups of firms 277

17 - Reclassified age groups of products 277

18 - Reasons for initial establishment 278

19 - Ranking of initial location factors of firms 279

20 - Age differences on initial location factors 280

21 - Type of ownership 282

24 - Head office of parent companies 284

23 - Type of industry (initially chosen by entrepreneurs) 285

24 - Motives underlying company growth 287

25 - Number of strategies for growth 291

26 - Actual combinations of strategies 293

27 - Multiple response analysis on the growth strategies 297

28a - Secondary Manufacturing Industry 299

28b - Type of Industry 301

29 - Industry changes by firms 302

30 - Principal industry diversification 1970 - 1978 303

31 - Market areas of firms 306

32 - Hierarchy of market areas 307

33 - Actual market area combinations 308

34 - Potential revenue activities searched by firms 310

35 - Number of product lines 311

36 - Details of changes in the product lines 312

37 - Changes in product lines 312

38 - Multiple response analysis of company structure 313

39 - Characteristics of subsidiary operations 316

40 - Significant associations between the age of the firms and the age of their subsidiaries 320

41 - Employment 321

42 - Total employment changes in respondent firms 323

43 - Value of shipments of own manufacture (gross sales) - 1969 324

44 - Total Wages and salaries paid in 1979 326

45 - Frequency distributions of responses to changes in primary goal of firms 327

46 - Details of changes in primary goal 328

47 - Year when changes in primary goal occurred 329

48 - Significant relationships between the total responses to each strategy and the age of the firm ..330

49 - Summary of the multiple response crosstabulation between development phase and markets 331

50 - Significant relationships between the responses to each strategy within each category, market area, and other controlling variables 332

51 - Development phase and industrial diversification ...333

52 - Significant correlations between the age of the firms and scale variables 334

53 - Significant relationships between age and scale variables 336

54 - Relationship between development phase and employment changes 337

55 - Year when innovation commenced 339

56 - Number of innovationsin firms 340

57 - Multiple response analysis of the type of innovations 341

58 - Actual combinations of the type of innovations mentioned by the firms 342

59 - Summary of multiple response crosstabulation between innovation types and development phase 343

60 - Sources of innovation 344

61 - Existence of R & D in the firm 344

62 - R & D regarded as a profit centre 345

63 - R & D part of general marketing policy 345

64 - Significant relationships between both patented and unpatented innovation and associated features 346

65 - Summary of the multiple response crosstabulation of innovation and strategies 347

66 - Significant relationships between the number of innovations (patented) and controlling variables 348

67 - Licenses and other forms of legal protection 349

68 - Location of firms that granted the licenses 350

69 - R & D undertaken in the last five years 351

70 - Resulting products from company's R & D activities .352

71 - Resulting products from R & D conducted by parent ..353

72 - Attitude on R & D 354

73 - Contribution of R & D to performance aspects 355

74 - Frequency distribution of the multiple responses on the influence of parents on the R & D activities of their branches 357

75 - The extent of parents' supervision on branches 359

76 - Views of the present and future prospects of innovation in Canada 359

77 - Views on the climate for technological innovation ..360

78 - Views on the impediments to more effective use of technology in industry 360

79 - Suggestions to government on ways to promote more innovation 361

80 - Views on organized research pools 361

81 - Summary of relevant federal government programmes ..362

82 - Summary of relevant provincial government programmes 363

83 - Frequency of use of government programmes 364

84 - Multiple responses of government influence on company 364

85 - Views expressed on all the government programs 367

86 - Results of the Kruskal-Wallis one-way analysis of variance by ranks 368

87 - Number and type of moves (city) 375

88 - Number and type of moves (province) 375

89 - Year of last move 376

90 - The main correlations between the location decision variables and the controlling variables 377

91 - Constraints on growth - significant variables 379

92 - Action to be undertaken on constraints 381

93 - Outline of incentives provided by Canada and the United States 382

List of Figures

1 - Basic life cycle of products 246

2 Centre-periphery relationship 247

3 - Generalized growth patterns of nine industrial sectors 248

4 Distribution of development phases in the prairies 249

5 - Young firm/mature product 250

6 - Young firm/old product 251

7 - Mature firm/mature product 252

8 - Mature firm/old product 253

I. INTRODUCTION

A. Purpose

The overall objective of this study is to identify the development phases (based on firm and product age) of prairie manufacturing firms and the results of the firms' decisions relating to growth associated with each phase. This research is aimed at contributing to the understanding of development characteristics of firms in a peripheral region. In particular, it seeks empirical evidence regarding the impact of age on the distribution of manufacturing firms. In explanations of differential manufacturing development within states, regions or urban systems, the impact of decisions made by firms of different ages has been largely neglected. Firm age and product age are contemporary concerns because of recent technological changes and the consequent structural changes in industries. It is becoming increasingly important that as firms age, they need to readjust their operations to conform with new technology in order to be competitive. It has also become apparent within the last two decades that in order to generate a high income and a high level of employment, new firms need to produce young products. The application of the existing stock of technology in a particular region enables rapid progress, at least in the short run, but for any given production technique and the products generated, there are long run limitations on the growth of productivity. New technology can help to avoid the limitations on the growth of productivity.

In trying to explain the growth of manufacturing firms in certain regions, traditional economic geographical approaches have examined either aggregate distribution distribution patterns together with correlated variables to seek causal relationships or they have focused on the identifiable and spatial linkages of firms for their inputs and outputs. An aspect such as a firm's development phase has implications for regional development focused on manufacturing firms because of its incidence in terms of the different phases characterizing firms in different locations. The birth and death of firms, their physical expansion or contraction and their migration, are elements of spatial change, which elude satisfactory interpretation through either of the above orthodox approaches. The relationships between a firm's development phase, investment and locational behaviour have, however, ramifications in terms of innovation, employment, market development and the multiplier impact of the firm in a community.

In the context of the historical problem of economic diversification facing Prairie governments, it is an understatement to say that research into the development phases of manufacturing firms will have policy implications for regional development. It is clearly important to find out the facts, the relationships and the implications involving the various development phases of Prairie manufacturing firms. Insights might be gained then into such questions as:

1. What is the distribution of young, mature, and old firms between industries and types and sizes of centres?
2. What are the regional development implications of this distribution?

The age factor as an explanatory variable of different types of behaviour appears in many concepts. It has a wide variety of applications. It can be applied to individuals, products, firms, and industries all of which go through an aging process, that is, they display changing patterns of behaviour specifically related to their maturation process. Although the age factor is an explanatory variable of many concepts, this study discusses age in relation to the two most relevant concepts which are the product life cycle and the filtering-down theories.

B. Scope of the Study

Although this study relies on the concepts of the product life cycle and filtering-down theories, it is not the intention of this thesis to test either of these concepts. The study is confined to identifying different development phases based on age and using the resulting taxonomy to discuss the behaviour of firms in the prairies, a peripheral region of Canada. Behaviour in this context is restricted to the results of the decisions of firms on location and investment strategies. This study is also confined to 'growth' manufacturing industries, that is, those manufacturing industries constituting the leading contributors to the value of shipments in the prairies.

C. Relevant Concepts

The product life cycle

Conceptually, a new product experiences a life cycle, beginning with its inception as an idea, its initial design and production, and progress through initial market experiments to an eventual market penetration. Finally, it reaches a point of either being phased out completely or of being drastically changed in reponse to changing technology and tastes (Amadeo,1973).

The roots of the product life cycle concept itself can be traced to an article by Kuznets(1929), who illustrated the many phases that a product must pass through. Vernon(1971), Well(1973), and Thomas(1974) have since elaborated on the concept. Firms producing in the early phase of a product are typified by high unit costs, high prices and a labour intensive production function with a high proportion of scientific and engineering inputs, which are limited in supply to large urban areas. During this initial phase, sales of the product increase, and as the market expands it attracts a growing number of firms producing the same product. Ultimately, the market is saturated at which stage the product has entered its mature phase. Entry of firms into the market then is either by merger or by indigenous enterprise.

In the marketing literature, product life cycle paths have been associated with the changing markets which influence the design and production of products during their life time and the consequences such changes have for the entrepreneur in terms of the need to adjust product characteristics. In a poignant assessment of the product life cycle as applied in the marketing literature, Dhalla and Yuspeh (1976) outlined several factors to invalidate the concept. Evidence was presented to show that products experience rejuvenation due to advertising which results in non-cyclical behaviour. In the absence of technological break-throughs, many product classes enjoy 'abnormal' life cycles. Examples of such product classes include radios and automobiles. In marketing especially, the product life cycle has been used so much by executives that it has become an independent variable rather than a dependent variable which should be determined by market actions. In other words, firms tend to adapt their marketing programmes to the product life cycle curve. The dependence on the product life cycle has led to unnecessary new product introduction (brand proliferation) and the life of existing brands may have been prolonged. The critique of Dhalla and Yuspeh may be valid to some extent, but their concept of the product life cycle is based on marketing strategy, in particular, on advertising. Also, their considerations and findings are for consumer products. In view of the orientation of the work by Dhalla and Yuspeh, it is not possible to dismiss the validity of the product life cycle for intermediate products which are less susceptible to advertising.

In the more production-oriented sphere, the concept has been used in operations research and project management, to provide a better understanding of the anatomy and physiology of Research and Development (R&D) projects. Hirsch (1967:16), states that changes in the rates of growth of industries 'occur in a fairly systematic fashion, and are therefore predictable'. He defines a new product as one manufactured by methods not previously used by industry, or based on a recent invention or unfamiliar developments. Hirsch's product life cycle path is in essence a single-product industry growth path. His definition gives the product life cycle a technological focus. This technological focus has been highlighted by De Kluyver (1977) who exmined the relationship between the degree of innovation that selected industrial component products represent and the shape of their product life cycle. He found three types of product life cycle for selected industrial components based on the degree of innovativeness which appears to affect the rate of adoption or purchase of the products. Regardless of whether the product life cycle pattern is a general rule or holds for specific cases, it does provide a useful and provocative framework for thinking about the growth and development of a new product or a firm.

There have been extensive references to the product life cycle concept in the field of international trade (Vernon,1971; Hirsch,1972). Table 1 summarises the product life cycle as adapted from Hirsch. This approach also, has potential for the study of the location of firms and regional development. It is built on the concept that a product innovation originates in one of the technologically most advanced countries, for example the United States, and is then diffused to under-developed countries when the product has been standardized. But, it must be recognized that exceptions must be made from sector to sector and from product to product. This approach is similar to the centre-periphery approach which forms the spatial basis of this study. The analogy can be made with the central, economically strong region(s) of a country and the peripheral, economically weak regions. Because of the locational elements of the product cycle model, traditional industrial location theory can be reconciled with it. Hoover (1948), noted that industries tended to disperse routinized stages of production from high-wage centres to low-wage areas. The product cycle model is also compatible with Berry's notion of the diffusion of innovation down the urban hierarchy, although this notion is generally not applicable. In fact, empirical works by Pred (1973) indicate that innovation tends to appear quickly in some or all of a country's urban units in a settlement hierarchy.

D. Filtering-Down Theory

The filtering-down theory is derived from the product life cycle theory. The basic premise of the theory is that firms locating in small regional centres as opposed to metropolitan centres are producing products in an old-age phase and are characterized by routinized production processes and low wages. It has been suggested by Muth(1968), Roterus(1970), and Thompson(1972) for the United States, that firms 'filter down' through the national system of cities. The filtering down theory of industrial location draws upon the concepts of innovation, industrial organization and comparative advantage. Thompson argued that the larger urban areas are more than proportionately, centres of creative minds. The larger urban areas innovate more and, therefore, enjoy the rapid growth rate characteristic of the early phase of a product life cycle. As the product matures and a replacement market is created, the rate of job formation associated with the production of the product slows. The high wage rates paid for the advanced skills needed in the beginning phases of the learning process, become excessive when the skill requirements decline and parts of the industry (firms producing the particular product) filter down to the smaller, less industrially advanced regions, where cheaper labour is matched with lower skilled occupational demands. In other words, industrial decentralization is the spatial manifestation of changes which occur in production and industrial organization, in accordance with the product life cycle. This reasoning can be applied to the Prairies. Although it is a peripheral region within the Canadian economic system, nevertheless, it contains large metropolitan centres, where creativity can reasonbly be assumed to exist.

Implication of Concepts

The product life cycle and the filtering-down theories are relevant to a study of manufacturing firm distributions because they point to a decentralization of production from the national centre to the periphery with the result that external economies can be built up in the periphery. This decentralization can then increase regional demand to a threshold where an industrial seed-bed effect through the spin-off of small firms from the 'lead firms' occurs. Regions, such as the Prairies, not only become the location of industries in the mature phases of their product cycle but can then, also, contain innovating centres.

For the purpose of this study, the regional development implication of the relevant elements of the product life cycle, that is age, and filtering-down theory (the product and technological production characteristics of firms within a national system of cities) is that peripheral/disadvantaged communities receiving or generating (indigenous) firms at the end phase of the product life cycle, should attempt to intercept or initiate firms at an early phase of the product cycle. This is necessary in order to provide higher incomes and greater local impact in employment.

E. Framework of Analysis

In order to gain an overall insight into the locational and investment characteristics of prairie firms at different ages, three approaches are adopted for this study. First, some relevant factors which influence manufacturing firms location and growth potential in general, are examined within the context of a centre and periphery relationship. It is assumed that the prairies are peripheral and as such, they are likely to receive or generate firms with older products. The factors responsible for the development in Canada of a centre-periphery relationship and its alternative are examined. The discussion of the factors are largely inferential because most of the factors have not been empirically examined within the Canadian and prairie context. However, those factors which stimulated the emergence of manufacturing and contributed toward its present status on the prairies are identified.

Second, the growth patterns of leading manufacturing industries are examined in an historical context. The growth of the industries, based on aggregate published information, is examined in terms of changes in the number of establishments in the industry, the number of employees, wages, value of shipments and value added, during a nineteen-year period.

Both the first and second approaches provide an overview of the environment in which the firms operate and the aggregate changes which have occurred. However, the appoaches do not explain the behaviour of the firms and in particular, the type of firms (in terms of the nature of their operations) responsible for the aggregate changes. Categorizing firms according to their development phases is in fact descriptive and classificatory. This is, however, only an initial step. The main focus of this study lies in understanding the significant factors associated with each development phase and their relationship to a firm's spatial behaviour. The significant factors refer to the processes which underly, produce, maintain or change the condition of a firm's development phase. These factors can only be ascertained through an empirical investigation of firms.

The general problem, therefore, is to unravel the factors underlying the particular development phases of a firm and to show their relevance to the location of firms in Prairie metropolitan and non-metropolitan centres. The significant factors, such as, strategies for growth including innovation, corporate structure and locational decision-making, related to turning points in the development phases of firms, have not yet been identified in the prairies. These factors could help to explain the changing geography of Prairie manufacturing. The elements of manufacturing change, which can be tested feasibly, include the birth of new firms, the expansion or contraction of firms, the merger or acquisition of firms, and the emigration or immigration of firms to a particular location. The net product of such changes will comprise changes in the amount, type and the impact of manufacturing in specific locations.

F. Propositions to be Tested

The scale of the subject matter prevents the postulation of traditionally tight, quantitatively expressed hypotheses. However, it is possible to state the nature of the findings expected prior to the start of the survey. The central issue to be examined is the differences on location and growth characteristics of firms in different development phases in different levels of urban centres. Literature pertaining to factors which form the bases of the hypotheses is reviewed in Chapter Two.

Ho 1 There are significant differences between the initial location factors of metropolitan firms and regional firms at various development phases.

To substantiate this hypothesis, initial location factors such as the structure of the firm, founding characteristics, type of ownership, legal structure, and the extent of corporate control are examined. The majority of the factors are derived from existing literature.

Ho 2 There are significant differences in the goals and growth strategies of firms at different development phases in different levels of centres.

Growth is assumed to be a major objective of firms but not the only objective. To fulfill the various objectives, many strategies are adopted. Most of the strategies and goals are identified from the literature. Other factors to be examined as part of the fulfillment of this hypothesis include company priorities, investment decisions, markets, research and development activities, sources of invention, types of innovation, government assistance and its effectiveness in aid of firm growth.

Ho 3 There are significant differences in the type of location decisions made by firms at different development phases in different levels of centres.

This hypothesis constitutes the spatial expression of the second hypothesis. The focus is on location decisions other than the initial location decision. These include decisions made on branch plants, relocation, acquisition/merger and expansion-in-situ.

Ho 4 There is a significant relationship between the type of growth constraints or stresses experienced and the development phases of firms located in different levels of centres.

It is assumed that firms experience stress at every development phase but the type of stress expressed at a particular phase is unknown. The main emphasis is on internal stresses and to a lesser extent, external stresses. The sources and the types of problems are examined. Again the concept of stress in a firm's environment is derived from the literature, particularly that on locational change.

G. Plan of Work

Since this study is concerned with the behaviour of firms at different age phases, it is necessary to review the relevant theories dealing with the growth of firms from their formative period to their mature phase. This review is carried out in chapter two. The crucial variables relevant to this study, which are mentioned repeatedly by writers in the different fields of research, are identified and further questions raised. An approach that links behaviour of firms at different development phases to manufacturing change is then proposed. Rather than simply infer the development patterns of the firms from the patterns of their respective industries, a behavioural approach is adopted. Each factor underlying the growth process of firms is discussed in relation to existing empirical research. Before the significance of development phases of Prairie manufacturing can be examined, it is necessary to investigate the environment in which these firms are operating. Within the Canadian economic system, the Prairie environment is peripheral. The characteristics of Prairie manufacturing are discussed in chapter three. Also, in the same chapter, an attempt is made to uncover differences between prairie and centre region industries through an investigation of selected manufacturing industries. The methodology for fulfilling the objective and for testing the hypotheses is given in chapter four.

The main conclusions on the development phases of Prairie manufacturing firms are presented in chapter five. Chapter five is divided into two sections. The first consists of a general discussion of the characteristics of each development phase and a comparison of firms in different development phases on significant variables between major metropolitan centres and regional centres. The second section consists of models of development behaviour based on each development phase. The last chapter (six) comprises implications for regional development, policy recommendations, and suggestions for further research based on the completed study.

II. APPROACHES TO FIRM BEHAVIOUR

Since this study examines the behaviour of firms at various phases of their life cycle in a peripheral region, a review of the relevant aspects of applicable theories is necessary. The literature pertaining to the behaviour of firms is voluminous and diverse. However, several categories of studies within the literature can be identified. Although related by topic they have different methodological approaches. This review is concerned with two major fields: non-spatial theory of the firm and location theory. Non-spatial theory of the firm encompasses the traditonal focus of profit maximization and the behavioural approach. Location theory concentrates on the behaviour of producers in space.

A. Theory of the Firm: Non-spatial Approach

The traditional theory of the firm

Economic theoretical reasoning during the 1930s, resulted in a break from the theory of value. Essentially, the theory of the firm is general equilibrium theory based on perfect competition and perfect knowledge. It assumes that there is certainty of action taken by entrepreneurs who are profit maximizers. It also assumes that each entrepreneur operates in a single product market, but in competition with a large number of other producers. The entrepreneur is concerned with making decisions on the basis of two sets of data, costs and revenues, both of which are continuous functions of output. The behaviour of the entrepreneur is unaffected by product or technical changes. Chamberlain (1935), tried to incorporate the ideas of product differentiation and monopolistic competition into the theory of value. He was aware that new products affected demand and that some firms would tend to improve their market shares. But he could not account for the overall effects of new products on firm behaviour.

The simplicity of the theory is appealing, but it would be difficult to implement in practice. The major criticism of the traditional theory is not so much of the way in which firms make decisions but more of the methodological question of the significance of the assumptions. Profit maximization as an objective is the most controversial. The objective may be valid in a short-run situation of perfect competition, but in the long-run profit maximization becomes a question of survival. With a monopoly situation in the long-run, the firm can survive without maximizing profits. An area of discretion enters into its behaviour. The firm is faced with other objectives and must, therefore, justify profit maximization in conjunction with the other objectives. A strong challenge to this assumption has been posited by advocates of organizational theory. In situations where ownership is separate from control, differences on objectives are bound to exist (Marris, 1964). In other words, managers may have objectives other than profit maximization and their objectives may be different from those of shareholders. Another criticism of the traditional theory centres on its static equilibrium approach which is a timeless state. The plausibility of assuming that there is an optimum size for the firm in the static long-run has been undermined by observations that firms experience constant or increasing returns as they grow (Penrose, 1959). The theory is incompatible with oligopolistic situations. It assumes that the firm's environment must be exogenously given, but in an oligopolistic situation there is an interdependence between the behaviour of the few firms involved. The action of each firm affects the environment of the other firms. The assumptions of the traditional theory are even more unreal for the manufacturing industries because oligopoly exists in some manufacturing industries, at least in the United States(Bain, 1970). Since the traditional theory is designed to handle mainly the determination of price and output of individual products only, it cannot account for the behaviour of modern business in relation to labour, government and innovation. These relations affect the determination of price and output of the products. Technical and product changes are completely ignored. Another criticism of the theory is its assumption of certainty (perfect knowledge). When there is uncertainty about cost or demand conditions or even the presence of other objectives, equilibrium can no longer be obtained.

Reformulations of the theory of the firm designed to take account of the objections outlined above have taken two forms. The first form is really an extension of the traditional theory. It follows a maximization paradigm, whereby the problem is that of maximizing a given objective subject to given constraints. This form embraces largely the marginalist theories of the firm. The objections to the traditional approach are met but the marginalists still assume rationality as a means of pursuing clearly defined goals (Baumol, 1959; Machlup, 1967). The second form is the behavioural approach, which is a marked contrast to the classical and neo-classical approaches. Imperfect knowledge bounded rationality, and the occurrence of multi-dimensional goals affect firm behaviour (Simon, 1962). A further discussion of this approach is presented below because a major premise of this study is that the behaviour of firms in various development phases is different.

Behavioural approach

The behavioural school examines the firm as an organization structure, using organizational theory to develop a behavioural theory of the firm. The best known application of this contribution to the theory of the firm is that developed by Cyert and March (1963). The theory identifies contradictory behaviour by firms, assumes imperfect knowledge and proposes that many objectives are to be satisfied. In this state, changes are only considered when a problem arises. The firm is seen as an adaptive organization, in other words, the time path of the firm's decision is a learning process. As a summary of their theory, Cyert and March (1965:100) advanced four relational concepts:

1. Quasi-resolution of conflict, that is, a compromise among the individual members of the organization on goals.
2. Uncertainty avoidance, which means that any stress is dealt with on a day to day basis (short-run).
3. Problematic search, that is, search is continuous until the problem is solved.
4. Organizational learning which means that the members of the firm learn from their past experiences.

Overall, the theory fails to account for long-run adaptive process. It makes no statement on the behaviour of firms at each phase in their development process. Longer term considerations of survival and strategic planning are excluded. The two non-spatial approaches are to some extent complementary rather than competitive, since they are addressing different issues. As Cohen and Cyert (1965) asserted: the traditional approach is oriented to the price mechanism as a means of allocating resources among markets, whereas the behavioural approach emphasizes the way in which resources are allocated within the firm.

Theory of the Growth of the firm

The importance of growth is not a feature emphasized by the traditional theory of the firm. The traditional theory emphasizes the concept of 'optimum size', that is, where the economies of scale have been fully utilized but diseconomies have not yet emerged. It is a static theory. Since the modern firm is often large, whatever the basis of measurement used, it is necessary to examine how and why such a firm has achieved its size. This examination is also warranted because it is assumed in this study that as firms age they behave differently.

All the theories dealing with the growth of the firm are essentially concerned with the rate of growth. The basic concepts of the theory of corporate growth have been provided by Downie(1958), Penrose (1959), and Marris(1964). All three questioned whether there is a limit to firm size once the traditional concept of optimum size is abandoned. They all agreed that there may be no effective constraints on the sizes of firms but that there are constraints on their rates of growth. The size of a firm at any time can be explained in terms of its past size, constraints encountered and the objectives of its decision-makers.

Downie stressed the constraint of technological access. Firms with superior technologies grow faster. Access to finance and the ability to attract new customers through price reduction also contribute to growth. He did not mention the influence of expenditure on advertising. The maximum rate of growth is set by the interaction of the financial (funds to acquire capacity) and demand (customers) constraints. Only an efficient firm can bring about this interaction. For the less efficient firms in order to regain their market shares they must find other competitive avenues. One such avenue as Downie suggested, was that innovation would be chosen by the less efficient firms, as illogical as this may seem, because of their poorer capital, skills, and often resources. The next technological break-throughs are more likely to be made by the less efficient firms. His ideas are practical if an industry is defined in terms of technical similarity only. But, his assertion of technological break-throughs by the less efficient firms is highly debateable. In fact, innovations stem from small, new firms and/or from established giant corporations (Jewkes, 1969).

Penrose concentrated on the internal characteristics of the firm. She maintained that diversification is a central aspect of the behaviour of the firm. She argued that managers maximize long-run profits but not necessarily for the benefit of the stockholders. Dividends may be kept very low so as to allow retained earnings to be used for expansion. However, the rate of growth of the firm (through diversification) is limited by managerial constraints. A low profit performance hinders the manager's ability to obtain funds from the capital market (at least at low interest rates). The possibility of acquisition due to unreasonable share prices may affect the efficiency of managers. Managers may also devote their efforts to high profit performance so as to be able to recover high managerial income. Another form of managerial constraint may be due to uncertainty about the growth potential of the firm. This uncertainty can also be caused by the lack of information flows through the organization. The major contribution of Penrose centres on the emphasis she placed on the various aspects of managerial activities which are of particular relevance to the present study. These aspects include diversification, innovation and merger. Although she concentrated on strategic activities she did not construct a formal, equilibrium growth model. Her ideas were conveyed in a verbal discussion of the various ways managers modify their perceived environment.

Marris combined the three constraints of demand, financial (Downie), and managerial (Penrose). He elaborated more on the financial restraint by developing a theory of takeover. He predicted that firms are more likely to be taken over if their stock prices are lowered to their book value. The stock market value represents the market's assessment of the firm's performance and prospects under its existing management. The book value represents the value of the resources tied up in the firm. The market value of a firm is determined by the discounted flow of future earnings, dividends plus capital gains, reflected in the price of its shares. He examined the relationship between the rate of growth and market value by considering the three major avenues open to managers for borrowing money to expand. If the managers choose to borrow they have to be able to maintain interest payments. Inability to pay not only leads to bankruptcy but may lower the firm's leverage in the lender's market. A firm may also issue new shares, but if the expected earnings on the new shares are perceived to be low, such a perception will lower both the prices of the new and the old shares and eventually there will be no takers.

Undistributed profits are another source of finance for expansion. If the stockholders perceive the new venture to be unprofitable and that it may not lead to higher dividend payments, they may dismiss the management team or more likely sell the shares. Selling on a large scale will eventually depress the value of the firm's shares. Low share prices may lead to take-over bids by other firms. If the firm is taken over, the possibility of the old management being dismissed is very high. The fear of a take-over, therefore, poses a constraint on managerial behaviour, especially with regard to expansion. The main point is that a firm will be taken over if its actual valuation ratio (the ratio of stock market value to book value) falls below the subjective valuation ratio put upon it by potential bidders in the stock market. Whilst most of Marris' propositions are directed to large public corporations, which are quoted in the stock markets, his proposition of borrowing for expansion is still applicable to private firms. The latter constitute the majority of the firms in a peripheral region such as the Prairies.

In summary, the theories of growth of the firm have been identified in the work of Downie, Penrose, and Marris. Conceptually the three theories indicate that there is no upper limit to the ultimate size of firm, but there is a limit to the firm's size at any moment because there is an upper limit to its rate of growth, which depends on the relationship between growth and profitability. First, growth depends upon profitability. Second, growth above a certain rate, adversely affects profitability. Finance is needed for growth but in order to aquire the finance, a firm must be profitable. The adverse effects are due to the financial, demand, and managerial constraints.

B. Firm Behaviour and Location Theory

Location theory has evolved from the general theory of the firm developed by economists and regional scientists. The major premise of location theory is that a decision-maker within a firm weighs locational as well as non-locational factors. As part of this premise the decision-maker considers the existence of different factor endowments and factor costs by location and the substitutability available in many different production functions. The various theories of firm behaviour outlined above are aspatial because their concern is centred on the time factor. Although there are many schools of location theory, the first school associated with the development of location theory incorporates two different approaches. The first (least-cost theory) is an attempt to develop a partial equilibrium theory with the omission of demand factors. The behaviour of each individual is independent of others. The second is a general equilibrium approach, with a focus on market areas and very little emphasis on cost factors.

The main feature of the least-cost school (as developed by Thunen and Weber), which is also relevant to this study, is the dominance of a search for the location with the minimum cost of production, that is, where the total cost of transporting inputs and outputs is least per unit of output. Transportation costs are definitely an important factor in the location decision of firms but a theory based on costs only is too simple an analysis of the factors promoting the location of a firm. The theory offers no framework for understanding other forces at work. Several empirical studies (for example, Norcliffe,1975) have also shown that the attention devoted to transportation costs as a prime influence is unjustified. In addition, the omission of demand (which may be accepted if it is completely inelastic) and the assumption of perfect competition are unrealistic. Although Weber cited the influence of labour costs and agglomeration economies on location, he did not account for or failed to see the effects which aging and changing products could have on the location behaviour of firms. For example, lower costs may be incurred if more efficient fuel, materials (through new products) or new capital equipment are used. These changes may lead to transport cost reductions.

The second approach to the initial location theory focused on market areas. Since this approach ignores cost factors, it is as deficient as the least-cost strand. Losch (1954), developed a general equilibrium theory of the location of production. His theory is really an attempt to demonstrate the way in which each firm gains control over a market area, if it is assumed that the costs of production are constant at all potential locations. Transportation costs are borne by the consumer and the price rises with distance. A network of ideal hexagonal market areas is formed. This network is variable depending on the type of industry. The effects of changes in the behaviour of firms due to aging and product changes influencing the shape of the market areas are not explained. His ideal shape for locational stability cannot be maintained in a situation of rapidly changing products due to technological changes. These changes produce cost differences. Alternative sites are bound to exhibit different costs. He does acknowledge changes in techniques but discourages the adoption of new ones until the life of existing techniques is over. Other shortcomings can be detected in the Loschian system (Richardson, 1973). The criticisms revolve around his assumption of uniform population distribution in a system which produces concentrations of employment. This is obviously contradictory.

Several schools have developed since these original theorists. One has focused on further refinements of the classical distance-minimization theory based on either the least-cost approach or the locational-interdependence/market area approach. Often the actual results in terms of location decisions are indeterminate. Smith (1971) attempted to combine the two approaches in terms of cost and revenue surfaces. Smith's work has since prompted further analysis on the spatial margins of profitability (for example, McDermott, 1973). Simulation models and game theory have also been used to examine optimal locational choice with uncertainties included (Stafford, 1972).

Among the neoclassical analyses a number of researchers such as Florence and Hoover have included product changes in their examination of the factors affecting industrial location. Florence (1953) was concerned with the factors that link the products of an industry and its locational pattern. He isolated factors such as the size of the plant, capital intensity and the geographical concentration of production in a sector. Hoover (1948), hinted at the effect of the product life cycle on industrial change when he noted that infant industries tended to arise in major centres. He concluded that the products or processes are decentralized to rural areas when they have become standard and routinized respectively.

C. Behavioural Approach and Location Theory

The last school of location theory that is of relevance to this study is the behavioural school. The approach of this school is a response to the changing day to day conditions in operating a firm. It draws heavily on the ideas from behavioural sciences such as systems analysis, organization theory and communications theory (Cyert and March, 1963; Simon, 1960). Risk and organizational factors are introduced into industrial location theory. The emphasis is on the individual firm and its decision-makers. But in order to understand the decision-making process, the structure of the enterprise must be examined. The firm is often viewed as a complex but open system operating in an external environment that is continually changing. The adaptive process of the firm in such an environment is based on the perceptions and attitudes of its decision-makers. The analysis of a location decision is no longer restricted to site selection, which is a small part of the organizational decisions needed. Hamilton (1974), all the contributors to his book of readings, and a number of contributors in Walker and Collins(1975), sought to demonstrate various aspects of firm and industry behaviour through the behavioural approach. As Hamilton (1974) noted in the introduction, location theory had to be revised because of the changing organization of the economy. This change includes the growing importance of capital intensity, multi-plant and multi-functional establishments, increasing plant sizes, and larger firms. It is finally in this approach that factors such as age and product changes (technology) are emphasized. In Hamilton (1974, p.13), the location issue is dominated by 'industrial organisation, firm or corporation;its goals, growth, size, age, production profile, organisation, and behaviour.'

Whilst this approach may allow the characteristics of the behaviour of firms at the various development phases to be isolated, it is nevertheless deficient in a number of areas. A major problem is that because this approach is based on surveys, it is data-demanding and time consuming. Even when large numbers of firms are selected (about 200 as in Hamilton, 1974) the number of questions asked are often limited or the field of study under investigation is small. For example, attention may be focused on one or two industrial sectors. Therefore, most of the studies confine their samples to between twenty and 100 firms. Attempts to make general statements based on surveys may be unconvincing. In addition, since a major premise of the behavioural approach is that individuals behave differently from one another, any attempt to aggregate their behaviour or find behavioural regularities presents difficulties. This is especially relevant to those studies whose objectives are devoted to the construction of theories. As a result of these deficiencies, the present approach is not an attempt to construct a holistic behavioural location theory but rather a series of suggestions on the behaviour of a firm at a particular time phase in its development. After the results of the empirical investigation have been discussed, an attempt will be made to construct a conceptual model of the spatial and aspatial behaviour of firms in a peripheral location based on the age of the firms.

The emphasis in this study, thus, is on a micro approach to the study of the firm. The firm is examined in terms of its behavioural approach to decision-making on factors such as those governing its initial location, strategies adopted for its development, ownership, structure, problems encountered, and changes in any of the factors. The behaviour of the firms in relation to the factors is discussed in terms of their particular development phases.

D. Development Phases and Manufacturing Change

Introduction

Most of the empirical analyzes that have been developed of the expected growth patterns of individual manufacturing firms over extended periods can be classified into two broad approaches (Kuznets, 1930; Burns, 1934; Hymer and Pashigan, 1962; Singh, and Whittington, 1968):

1. The growth patterns of firms are derived from those of their respective industries.
2. The growth patterns of firms are derived from those of their products assuming that each product follows a Gompertz curve, but allowing for managerial efforts to

> retard the decline of old products through the introduction of new ones.'

For an extended period after the major studies by Kuznets (1930) and Burns (1934), research in the growth patterns of industries and firms was minimal. Gaston (1961) and Gold (1964) re-examined and extended results obtained by Kuznets and Burns. Gold showed a variety of forms of industry growth paths, but there is no indication about the nature of the expansion path of firms which contribute to the industry or product series evaluated. Gold's findings were in conflict with the expectations based on Burn's Law of declining rate of growth followed by decline (progressive retardation growth model). The different findings may also be due to the techniques utilized. Whilst these approaches are useful for classifying and describing the life cycles of firms, they cannot demonstrate the mechanism by which the growth of firms takes place in particular locations or the factors responsible for the growth patterns because they are indirect and external to the firm. This is an area that is relevant for the understanding of the processes of long term industrial growth and structural change.

Entrepreneurs and government agents concerned with firm and industrial development policies and strategic choices should also benefit from having a greater understanding of

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' A curve of growth with a finite limit, exhibiting a declining rate of percentage increase. It shows the changes in absolute increase as dependent upon the influence of the approach to the limit (Kuznets, 1930, pp. 59-69).

the nature and implications of the development patterns of firms and industries in their areas. Some of the approaches discussed above have indeed tackled the problem of internal firm behaviour, but they are largely aspatial. In fact, the research literature on the location of manufacturing in economics and geography is considerable but actual studies which relate the elements of manufacturing locational change to the development phases of firms are few in number. There has been an upsurge of interest in the filtering-down of industries from the large urban areas of the north east United States to non-metropolitan states (Lonsdale and Browning, 1971; Thompson, 1975; Erickson, 1976; Summers et. al., 1976; Leinbach, 1978; Lonsdale and Seyler, 1979; and Cromley and Leinbach, 1981). But, there has been no attempt to compare the development phases of firms in metropolitan areas within the peripheral regions. Most of these studies have been concerned with the establishment of branch plants by national and multi-national companies located in central areas. While this study is not so much concerned with the filtering of branch plants, it is, however, concerned with the proposition that peripheral areas tend to be characterized by firms (indigenous and foreign) with routinized production processes or old products.

Studies attempting to measure the changes in manufacturing in a specific city or region have generally relied on aggregate published or unpublished statistics together with some information from survey data.

Increasingly, the direct approach to the firm has become more significant because it has been recognized that acceptable explanation of locational decision-making requires data on the behavioural variables of entrepreneurs as well as the location of factors of production of the firm. Increasingly, this has also been recognized by governments. In 1976, the Manitoba Economic Development Board (1976) published the results of a major report on the trends in the industrial development of Manitoba. One of the recommendations by the Board, significant for this study, is the need to assess the characteristics of secondary manufacturing through a behavioural approach. This allows explanation to proceed beyond a factual description of change in manufacturing distributions, to some understanding of why it is that firms expand, and/or migrate at various development phases, or are created at various phases in the life cycle of the product.

The Birth of a Manufacturing Firm

The birth of a firm is preceded by at least three decisions, which will together determine success or failure (Smith, 1971). These decisions are:

1. the scale of operations,
2. the technique to be adopted and,
3. the location of the firm.

Once the entrepreneur has made these decisions the firm begins its existence as a manufacturing concern. But firms are created at different phases in the product cycle. They are created by indigenous entrepreneurs and by non-local entrepreneurs. The latter group consists of large firms or multinational corporations. The initial emphasis will be on the autonomous or semi-autonomous firms, that is, those created by local entrepreneurs. A discussion on branch plants (that is, firms created by non-local parents) will follow.

For the purpose of this study, the birth of a manufacturing firm is defined as the creation of an entirely new enterprise which did not formerly exist as a manufacturing organization in that or any other area. Births can result from the enterprise of individuals (a) with a new invention, a different set of ideas; (b) with a new production process; or (c) the creation of a new firm by an existing but non-manufacturing firm. Often the new entrepreneurs are former employees of a local firm and locate in the same local environment because it is familiar. They have long-standing contacts with people there and it reduces uncertainties in risk-taking (Mueller and Morgan, 1962; Beesley, 1955; Taylor, 1965; North, 1974, and Keeble, 1976). The familiar environment propagates the so-called 'seed-bed' growth of new firms (Taylor, 1969). The process whereby new firms are created by former employees of local firms has been termed 'hiving off' and is most typical of engineering and metal fabricating and new industries, such as electronics, which have a fast growth rate and to which entry is relatively easy in terms of technological and financial requirements (Bain, 1956; Penrose, 1959; Taylor, 1969; and North, 1974; Oakey, Thwaites, and Nash, 1980; and Oakey, 1982).

The phenomenon of innovation has received little attention yet in the explanation of manufacturing change, despite Schumpeter's (1939) claim that 'innovation is the outstanding fact in the economic history of capitalist society.' According to Schumpeter, innovation was not an automatic response to market conditions but was dependent on the originality of the inventor. The main problem with Schumpeter's argument is that he offers only a weak argument for the ability of an innovation to create a "swarm" of innovations strong enough in its effects to cause an economy-wide effect. Schmookler (1965) held the opposite viewpoint that innovation was a response to changing economic and technological conditions. Both the changing conditions and the originality of the inventor are probably involved in the innovation process. With respect to the birth of new firms resulting from innovation, evidence so far indicates that such firms are not numerous (Gudgin, 1978). However, the importance of these firms lies in their potential ability to form the basis of industrial complexes and centres, and their ability to attract and employ highly skilled and professional people in particular locations. There is debate still about whether innovation more often occurs in small firms or large ones with directed research activity. It should be noted too that directed research is also not unknown in small firms. Schumpeter (1954) has expounded on the merits of the latter while Jewkes (1969) favoured the former as being more conducive to stimulation of innovations. It may be reasonable to postulate that small firms may have some comparative advantage in the earlier phases of inventive work and the less expensive, but more radical innovation, while large firms have an advantage in the later phases and in improvement and scaling-up of earlier break-throughs. Moreover, there are significant differences between industries in the relative performance of small and large firms. The prevalence of small firms in the Prairie provinces of Canada makes this debate particularly pertinent to the diversification of the regional economy. Both large and small firms resulting from innovation can affect the spatial distribution of manufacturing as well as its diversification.

Spatial Impact of Invention/Innovation

The spatial effects of invention and innovation are well documented by Pred (1966). He described the attraction of American urban areas to inventors and noted that:

> new or enlarged urban industries and their multiplier effects created employment opportunities that successively attracted 'active' and 'passive' migrants to the infant metropolises, and eventually led to additional manufacturing growth by directly or indirectly enhancing the possibility of invention and innovation. [1]

Pred's model is based on the hypothesis that inventive activity is not randomly distributed throughout the population, but that it is more concentrated in urban places. To validate his hypothesis, he found a high positive correlation between patents granted to individual states and the number of persons residing in the metropolises of those states. He also argued that innovation takes place in the city where the invention occurs and that the data on the location of patentees give a measure of the probable point of introduction of new technology. The advantage which large cities enjoy is in terms of information maximization and risk minimization. The risks of adopting an innovation are reduced if they are first introduced and tested in the nation's 'safest' market, its largest urban centre with its surrounding region (Oakey and Goddard, 1979;Malecki, 1979). In their study of the mobilization of indigenous potential in the United Kingdom, Oakey and Goddard concluded that south east England was not only the major source region for innovation transfer, but that it was also the main beneficiary from its dominant role in this process. Thus, in terms of the transmission of growth, the urban hierarchy plays an important role. As Pred (1973) pointed out, an innovation tends to appear quickly in some or all of a nation's system's largest units. In a hierarchy of central places, the transmission of growth does not follow a rigid progression from high to low order centres. The tendency is for both information and innovation activity to be concentrated and recycled in larger, higher order urban centres and for interaction to be greatest between large centres.

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[1] Pred, 1966. p.39

Within the Canadian context, Richtik (1976), using patent data, found that Canadian urban industrial growth between 1881 and 1901 followed the general trend of the U.S. as hypothesized in Pred's 1966 study. However, Richtik was able to determine certain differences. In support of Pred, industrial southern Ontario and the largest cities - Toronto and Montreal - were characterized by high manufacturing growth rates because in these centres the technological and social milieu favour innovativeness. But, the members of the next largest group of cities, including Quebec city, Halifax and Charlottetown, did not show a positive correlation between manufacturing and innovation. According to Richtik, those centres were not big enough to profit from the scale factors suggested by Pred. A more plausible explanation can perhaps be found in the different origins and functions of these cities.

As mentioned earlier, one of the themes of the product life cycle and the filtering-down concepts is innovation. Thompson (1968), suggested that the advantages which large urban centres enjoy stem not only from their diversified economic base but also from their innovative strength. He stated that:

> the large urban area would seem to have a great advantage in the critical functions of invention, innovation, promotion and rationalization of the

new. [3]

Only at a later stage, when the innovation has become more standardized and accepted, is diffusion to smaller urban centres and peripheral regions feasible. It would, therefore, seem that success tends to breed success, thereby, leading to further growth in urban centres.

The study of the diffusion of innovation has not received much attention in Canada. As part of its comprehensive study of regional disparities, the Economic Council of Canada (1979) commissioned a project that sought to discover whether any significant part of income disparities could be caused by new technology being adopted later in some regions than others. For all the innovations examined - computers, steel furnaces, roof trusses, containers, newsprint and shopping centres, Ontario led in initial adoptions and had the lowest average lag time. The Atlantic region did not lead on any account, but another peripheral region, the Prairies, improved its position relative to the other central region (Quebec) and another peripheral region (British Columbia). The Council concluded that technological gaps were one factor among a number of others, leading to productivity gaps. A similar finding was put forward by Globerman (1974). He found the in general the adoption of new technology (in the pulp and paper, textiles and iron and steel industries) proceeded more slowly in Canada than in other developed countries. A time lag of five to ten years existed between the initial use of new technology in the United States and the initial use in Canada.

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[3] Thompson, 1968. p.53

The concentration of innovations in large urban centres of the central region is also reinforced by the kinds of structural changes which occur in business entreprises. The way in which a modern business enterprise, which is often multi-product and multi-plant, organizes its different functions - administrative and operational - is of great importance in steering growth impulses through the economy. The administrative and control functions, such as research and development activities, of large corporations have a marked tendency to be concentrated in large agglomerations (Crum and Gudgin, 1978;Malecki, 1979). Malecki (1979) found that although industrial R&D appeared to be evolving away from a dependency on some large city regions, such as New York, it nevertheless remained a large city activity within the north east United States urban system. According to Buswell and Lewis (1970), Pred (1974, 1977), and Thwaites (1978), multi-product corporations, prefer to incorporate their R&D facilities with their head offices located in the central regions because of the ease of contacts, availability of high quality information, prestige and inertia. In this context, an approach focused on the age of firms and their products is especially relevant in that the plants often 'trickled down' by the multi-plant corporations, have fewer R&D offices. The branch plant is the organizational response of corporations to utilizing peripheral low-wage and unskilled labour at an appropriate phase in the product life cycle. But, in the context of the periphery-centre relationship it is also probable that many new firms in periphery areas, including those Prairie metropolitan cities where necessary innovativeness and skills exist, are producing at the initial stage of the product cycle.

New manufacturing firms can also be created by an existing non-manufacturing firm and/or large multinational firms. The new firms established by the larger corporations in peripheral areas are often associated with the production of mature products. The manufacture of mature products involves standardized production methods and less stringent labour skills. If the premises of the filtering-down theory are valid, centres located in the peripheral areas are typified by low and semi-skilled workers with lower wages. Large corporations believe it is to their benefit to establish branch plants in those areas. These branch plants are mainly engaged in assembly, fabricating and other routinized production processes (Erickson, 1976). Such births are planned with large firms having more resources at their disposal for these branch plants than small firms (North, 1974; Keeble, 1976). North pointed out that the locational pattern of such planned births in the British industry was similar to new firms created by the 'hiving off' process. Both types required the external economies and linkages provided by the immediate, familiar environment. If such is the case in the Prairie context, then one would expect them to locate in the larger urban areas. However, the motives underlying the decisions made by non-manufacturing firms are still relatively unresearched, particularly with respect to the degree of innovation involved in their plants.

In the light of the foregoing discussion, some relevant questions in the prairie context are:

1. Do young and old firms, as determined by their age since establishment, which produce young products, exhibit different investment and locational characteristics from those young and old firms based on old products?
2. Is there any evidence that peripheral industries are characterized by standardized production?
3. Does innovation occur more often in firms of particular industries, or in particular locations?
4. To what extent do small firms vis-a-vis large ones in the regional context, propagate innovations, new firms or firm expansion?

Firm Development

Depending upon the age of the product with which a firm originally starts production, it exhibits certain investment and locational characteristics with growth. Growth is defined by this writer as change in a firm's size as measured by employment or production or financial assets. It is a process of adjustment of the firm to its environment and a function of the goals of the firm's entrepreneurs. After Simon (1960), it is now generally accepted that most entrepreneurs are rational satisficers rather than optimizers and that most business goals are multi-dimensional (Dicken,1971).Business goals include prestige, power and job security (Parkinson, 1957), profit and cost minimization (Florence, 1953), revenue maximization (Baumol, 1962), monopolistic power, stability and survival (Starbuck, 1971). Perhaps the only fundamental business goal common to all business regardless of their organizational structure is survival. As Starbuck (1971:30) pointed out:

> An organization may not maximize profit or minimize cost. It may not impart prestige, power, and security to its members. It may not do many things. But one thing which it must do if it is to be an organization at all, is survive. [4]

However, the achievement of such goals depends upon the ability of a firm to adapt to its environment, which is defined as the surroundings of the firm and the business 'climate' within which it functions. An environment of this nature is considered to be dynamic. In addition, the existence of different corporate structures, that is, uniplant firms and multi-plant firms, mean that a variety of firm environments exist. As pointed out by Lloyd and Dicken (1977), the multi-plant firm and the single-plant firm are the same except that the multi-plant firm has more points of contact with its environment, that is, it has a far more extensive 'task environment'. The identification of the significant features of this environment to the firm, depends upon the firm's internal resources, its operations and the quality of its management (Penrose, 1959). Steed (1971) has identified the main environmental elements as: (a) cost conditions, (b) demand conditions, (c) government actions, (d) informal social pressures, (e) influences exerted by other firms.

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[4] Starbuck, 1971. p. 30

After deciding upon particular goals in the context of its environment, the appropriate strategy to attain the goals becomes important for a new firm once it has gained its feet (Chandler, 1962). Expansion internally or externally via acquisitions or merger, and from a single plant to a multi-plant operation may be alternatives.

Firm Development and Location Decisions

Most of the studies dealing with growth strategies, including Chandler (1962), are largely aspatial. The studies of Aharoni (1966) and Bower (1970) provide extensive coverage of growth strategies, especially in relation to investment decisions. None of the studies have examined growth strategies from the viewpoint of firm development phases in different locations. Most strategic investment decisions which firms make are aspatial. Nevertheless, the majority of these decisions do have spatial implications (Hamilton, 1974). The locational implications are often a by-product of a strategy to achieve some non-spatial goals or to alleviate some stresses facing the firm. In a model of location decision process developed by Lloyd and Dicken (1972), locational stress was attributed to changes in the internal requirements of the firm and the external attributes of the existing location of the firm. Expansion was cited as the most important cause of locational stress. North (1974) identified ten stresses precipitated by: planned growth of existing product lines, development of regional markets for existing products and services, unplanned development of regional markets, diversification into new product lines, vertical integration, horizontal integration, externally generated stresses , stresses exerted by the pattern of the firm's market distribution, a decision imposed by the parent company and rationalization of operations. These stresses could force a firm to adjust its location though he omitted the political factor which is potentially an important locational influence on investment decisions. Nevertheless, it has been concluded that for most firms, location decisions occur relatively infrequently during the life of a firm compared with many other types of investment decisions (Krumme, 1969; North, 1974; Rees, 1974; Townroe, 1976). This implies that long term planned locational changes are infrequent and that most firms react to environmental stress on an ad hoc basis, only then considering alternative locations for the firm. The frequency of location decisions may be related to the size, complexity, growth rate and innovativeness of a firm. These factors invariably raise the question:

> At what phase, if any, in a firm's development do plant location decisions become a significant factor?

In relation to a firm's development, growth is marked by increasing sales of the products and profits which are often ploughed back into the firm. As the market expands rapidly it attracts a growing number of firms. The ability to accumulate and invest capital is especially critical during the growth phase. For firms already well-established and for those entering the industry, the increasing demand invariably induces production and physical expansion. There are many options open to a firm. They include expansion in situ, migration, and acquisition and merger. A consideration of the reasons underlying those options which entrepreneurs choose, may offer additional explanation for the changes in the distribution of manufacturing.

(a) Expansion in situ: This is the most common form of locational decision (Keeble, 1968, Lewis, 1971; and North, 1974). If the site is adequate in size, if reorganization internally can allow the firm to achieve its goals or adapt to environmental stress in this manner, then it may be the strategy selected. Often relocation may be costly and the financial resources may not exist at an early stage in the firm's life.

(b) Migration: This is defined as the process of locating in new or vacated premises in a new location. Complete transfer of the firm and branch plant openings are included but migration due to acquisition or merger is not included. Recent research suggests that previous studies by, for example, Luttrell (1962), underestimated the frequency and extent of manufacturing location change by migration (Collins, 1972). Although a synthesis of both the empirical and theoretical studies on industrial movement is provided in Townroe (1982), much more needs to be known about the nature of such migration decisions. Townroe (1976) has pointed out that migration decisions are rare among small to medium firms whereas North (1974) found that young and small single plant firms with high growth rates often transferred their production activities from one location to another. In most cases the establishment of branch plants is the result of systematic planning by larger and older firms.

Firms transferring plants or establishing new plants have a marked effect on the distribution of manufacturing by moves which are within a centre (intra-urban), a region (intra-regional), and within the state (inter-regional). Often these firms are the fastest growing and most successful firms in the region's economy (Townroe, 1982). The locational choices made by these firms reflect the changing locational needs of their industries and the changing relative advantages of different regions of a country. The significance of some locational factors, such as transportation costs, may be diminishing while the importance of others, such as access to cheap labour, and energy rates may be increasing. Consequently, regions of a country previously attractive to industry as locations may lose, while other regions attract investment. In recent years, this type of industrial movement, which is embodied in the filtering-down concept, has become an area of prominent research. Many firms, especially multi-product firms, operating in the late growth or mature phases seek out non-metropolitan areas, where there is cheaper and less skilled labour. Branch plants of filtering-down industries frequently concentrate on assembly, fabricating or other routinized production processes. Whether branch plants display a different set of locational priorities from indigenous firms still has to be discovered. It is unlikely, however, that the motives for establishing branch plants and for transferring plants are the same because of different industrial characteristics and growth rates. Also, there is still little empirical evidence on the reasons underlying the migration decisions of firms in different development phases.

(c) Acquisition and merger: In the mature phase of the product cycle the tendency is for the market to be saturated. Apart from the establishment of branch plants, entry of firms into the industry is largely by merger or acquisition by indigenous enterprise. During the mature phase, two basic changes occur. On the internal investment side, the set of high yielding projects is reduced. First, the market becomes saturated with the particular product and second, imitation by other firms is prevalent. As firms in the industry, or related industries, begin to understand the innovation, they find ways around patents and other problems, and begin to imitate the innovation. To maintain high profitability, a firm's decision-makers must repeat their innovative behaviour in other areas. Some firms may be able to partially offset the effects of aging through R&D, organizational innovations and mergers and acquisitions.

Various economists have offered explanations for the motives underlying mergers and acquisitions. The more important explanations which have been advanced so far as indicated by the Royal Commission on Corporate Concentration (1979) include:

1. synergy, that is, monopoly power and scale economies (Nelson, 1959)
2. expectation and market valuation (Gort, 1969)
3. business cycle and the stock market (Markham, 1955)
4. growth maximization (Penrose, 1959, Mueller, 1969)
5. state of the environment in which the firm operates (Newbould, 1970).

No general theory has been developed for mergers and acquisitions. Instead, what is offered is a series of partial, sometimes incompatible hypotheses designed to provide explanations for particular types of merger and acquisition activities. More empirical evidence is needed to provide insights into why some firms prefer these strategies to expansion in situ or to branch plant development and to record and explain the spatial effects of mergers and acquisitions. It is probable that the local impact of these strategies in terms of employment or inputs purchased and outputs sold, is much less than that resulting from the migration of firms, and it may in fact be a negative impact resulting from rationalization of larger firms and the redundancy of employers. Within the prairie context it is necessary to ascertain the incidence of firms in urban and non-metropolitan areas acquired by merger or acquisition or using such strategies of development themselves and what effects they have had on employment and production. In addition,the question whether or not such strategies are considered only at a firm's mature phase, has to be examined.

Given that there is a high probability that industries do filter-down through the national system of cities, the relevance of the development phases of manufacturing firms is clear because of the relationship between a particular phase and a firm's investment and locational behaviour. Also, this relationship has relevance in predicting firm behaviour and in formulating government incentive policies for tackling regional disparities. In the light of the above discussion of the different elements of manufacturing change, two further questions might be posed.

1. How are location decisions influenced by firm size, ownership type and product type?
2. Does the proportion of firms in different development phases as determined by the age of firms and products,

vary between specific industries and between specific cities?

Before any of the questions raised on firm behaviour can be answered , it is necessary to consider the environment in which Prairie firms operate. In other words, it is necessary to examine the structure of the Prairie manufacturing economy. This structure and whatever changes the economy of the region may be undergoing, play a vital role in shaping the behaviour of the firms in various development phases.

III. CHARACTERISTICS OF PRAIRIE MANUFACTURING

A. Introduction

Within the last decade the traditional distribution of economic activity in Canada has been changing. This fact can be demonstrated by an examination of the current structure of prairie manufacturing and a temporal analysis of a number of manufacturing sectors. Although the magnitude of the economic shift is debatable(Norrie, 1979), there are indications that a periphery-centre interaction may be in process to the advantage of the periphery. Evidence of the periphery-centre process has already received some considerations in other countries, such as Britain. An attempt has been made to extract only the relevant findings to the Prairies.

B. Periphery-Centre Relationships

Unlike the more familiar centre-periphery relationship in the regional development literature, the alternative periphery-centre relationship has not been subjected to extensive empirical investigation or even theoretical refinement. In addition, many of the analyses have been carried out at different geographical scales. A diagram summarizing the centre-periphery relationship is shown in Figure 1. The various proponents of the centre-periphery relationship, such as Friedmann and Myrdal and Berry, Conkling and Ray (1976), have hinted at the interaction which favour the periphery-centre development. Keeble (1976) and the Centre for Urban and Regional Development Studies (CURDS, 1979) have gathered some evidence to investigate changes in peripheral development in the United Kingdom. At the national level as well as the regional level, the periphery-centre relationship postulates a shift in the spatial balance of industrial growth from the centre to the periphery as a result of the spread effects of growing markets, improving transportation and communication, government promotional activities, increasing innovation and the protection of distance through high freight rates. The problems associated with peripheral areas have often been expressed in terms of adverse industrial structure. As a result of the changing prices for energy related natural resources, the industrial structure of such a peripheral region as the Prairies has achieved a new dimension. The manufacturing base in particular is becoming more diversified. The changing industrial structure has also altered the pattern of output.

In spite of the dominance of central Canada, with its external economies in the Quebec city - Windsor urban system a chief influence on Canadian industrial location, recent studies (for example, Economic Council of Canada, 1977; and Li et. al., 1978) have begun to draw attention to the existence of centrifugal forces promoting the converse, namely relative industrial decentralization to the periphery. Using the export-base mechanism of the development process, Davis (1980) was able to demonstrate a substantial shift in the provincial distribution of national income and product. Between 1961 and 1977, prominent westward shifts were experienced in the mining, construction, manufacturing, and tertiary sectors. The form of income receipts were in wage and salary income, corporation profits, interest, and investment income. However, the statistical significance of these shifts remain questionable. Also, Davis mentioned substantial interregional multiplier effects for which he provided no concrete evidence. Nagarajan (1980) has also analyzed employment changes in Canada for 1961 to 1971. Through the use of the shift-share technique, he was able to isolate:

1. those provinces (PEI, Newfoundland, Nova Scotia, New Brunswick, Quebec, Saskatchewan and Alberta) which suffered declining employment shares in the past but are likely to improve in the future,
2. those which experienced upward shifts of employment growth in the past but may have suffered a deterioration in their industrial mix which could lead to net downward shifts of employment growth in the future (British Columbia),
3. those which had downward shifts in employment shares in the past and will continue to do so in the future (Manitoba).

The shift in the spatial balance of growth is naturally reflected in overall migration patterns. The two temporal analyses by Simmons (1980) provide ample support for a westward shift in the migration patterns. Both Ontario and Quebec showed a pronounced slackening in their rate of population growth. He noted a strong regional pattern, with a reduction of outmigration from the Atlantic provinces and the eastern Prairies, but an increase in southern Ontario and British Columbia by the end of his study period. The last two regions had recorded high in-migration rates at the beginning of his study period.

It is suggested that among the most important determinants of the periphery-centre relationship, relevant to the Prairies-central Canada context, are: labour advantages, agglomeration diseconomies, natural resources, innovation and government regional policy. These factors are discussed relative to their characteristics in the centre. An illustration of the core-peripheral relationship is provided in Figure 1.

Labour Advantages

Much of the evidence supporting a peripheral labour advantage has been produced from the United States and Britain. In a substantive book on non-metropolitan industrialization in the United States (Lonsdale and Seyler, 1979), some of the primary factors documented by Kale and Lonsdale as an encouragement to a southern shift in industrial location were labour availability, labour cost, skills, and productivity (Kale and Lonsdale, 1979). Wheeler (1981) has recently supported the importance of labour availability and labour cost as primary attractions to location in the metropolitan areas of a peripheral region (Atlanta) in the United States. In a study of British Development areas, Green (1974) found that labour availability was ranked second in overall relative 'favourableness'; locational attributes and labour cost were ranked sixth by the firms investigated. These last two variables were also rated highly unfavourable in central Britain by firms which moved from the centre to the periphery. A similar finding was implied by Springate (1972) in his study of the effects of the Department of Regional Economic Expansion (DREE) in Canada.

Apart from labour availability and cost, the Economic Council (1977) noted a number of labour attributes promoting increased productivity in the prairie provinces. The labour quality index for the prairie provinces was found to be comparable to Ontario. The educational attainment of employees in manufacturing was also equal to or higher than Ontario. However, observations based on a 20-year period (1960-1980) on the average hourly earnings in the manufacturing industry located in urban centres of four provinces suggest that the growth trend of wages is disadvantageous to industrial location in a peripheral region such as the Prairies (Table 2). This is in opposition to the trend proposed in the 'filter-down' hypothesis, whereby firms are attracted to peripheral areas because of low wage rates and surplus labour. In order to determine whether lower wage rates could be a possible attraction, a time series and a regression analyses were employed. The percentage rates of change of average hourly earnings were calculated. The average hourly earning was regressed against each of the twenty years. The results are shown in Table 2. Average hourly earnings in the Prairies rose very slowly during the early 1960s. In fact, the earnings in Manitoba declined between 1962 and 1963. There was no change in average hourly earnings in Alberta and Saskatchewan until 1963. For the Prairies as a whole the rate of change in manufacturing hourly earnings from 1960 to 1973 was less than that of Ontario. The latter province experienced a steady increase during the same period. Between 1973 and 1977, the Prairie provinces experienced a higher annual rate of growth in earnings. In Alberta and Saskatchewan the hourly earnings increased by between 15 and 20 percent per annum. Since 1977 the hourly earnings have been more or less the same in the four provinces, although the rate of change in Alberta and Saskatchewan has been about one percent higher. The rates of change of each province were significant at the one percent level of significance. The regression results showed that Alberta and Saskatchewan had higher annual rates of change with average earning increase of 30 cents per hour. Manitoba and Ontario had an average earning increase of about 23 cents per hour per year. It can also be argued that the present trends of high wage rates and labour shortages are of short term duration. In the long-run, immigration and increased competition would tend to lessen the current adverse effects.

For the Prairies at the present time, it would seem, therefore, that labour quality and educational attainment represent an important local stimulus to manufacturing growth.

Agglomeration Diseconomies

Since Weber's theory of industrial location, it has been recognized that beyond a certain level of concentration, agglomeration diseconomies appear. The diseconomies appear in the form of labour shortages, higher labour costs, high cost of land and premises, and the congestion and age of buildings. These diseconomies force firms to move out of the central regions into peripheral regions. Wheeler (1981) has provided more evidence of this occurrence. However, it must be borne in mind that the diseconomies of labour shortages and higher labour costs are no longer restricted to central regions, especially in Canada and Britain. In fact, it has been recently proven by Lever (1981) that high labour costs have forced firms to decentralize away from the Clydeside conurbation (a peripheral region) in the United Kingdom. In the Canadian case, evidence for the impact of agglomeration diseconomies on the regional movement of firms has not been documented.

However, on an inter-urban level, there is some evidence available for central Canada supporting the decentralization of manufacturing industries from within the

Toronto and Montreal agglomerations to their respective hinterlands (Kerr and Spelt, 1960; Field and Kerr, 1968; Collings, 1972; and Rushling, 1974). The spread effects exerted by the development of the agglomerations are most effective in areas close to the nodes themselves. According to Field and Kerr (1968) in their study on Toronto, the blight, congestion and security problems of operating in inner urban areas have combined with the effects of planning, to push industry outwards. They concluded that the pull of the suburban industrial part with all its amenities has drawn new and expanded manufacturing plants in all but those activities still tied to the inner city.

In general, it can be postulated that regional-scale diseconomies within the Quebec city - Windsor urban system do exist as an influence promoting decentralization within the region. The extent to which these diseconomies have forced firms to move from the centre to such peripheral regions as the Prairies, still has to be ascertained.

Natural Resources

The tendency in most industrialized societies is to exploit the most accessible raw materials (close to final markets) first, and then as each supply area becomes exhausted, to substitute a more remote supply area and/or a different raw material (Gilmour, 1974). This tendency has been incorporated in the staples thesis which provides one explanation for the pattern of Canadian development. The differences in the growth of regional incomes can be understood in terms of the shifts from one staple to another. The shifts have either been caused by a response to exogenous market demand or in terms of the localized exhaustion of a staple resource, as happened with furs and timber, a response to a supply constraint.

The Canadian development and distribution of economic activity, such as manufacturing was based on the exploitation of exportable commodities and residentiary industries catering to local market requirements. But, the control over the development, in terms of export, imports, investment capital and the selection of investment projects, remained in southern Ontario and Quebec. Little manufacturing development occurred in the hinterland. On the Prairies, the small amount of manufacturing was based on grain. While the industries based on agricultural staples are still of considerable significance, industries based on mineral staples have assumed more importance in recent years. Attention has been focused on Alberta in particular, since the province's economic growth has been helped by marked increases in oil and gas prices. According to Li et. al., (1978), there has been an east to west growth gradient in manufacturing resulting in a regional shift of manufacturing emphasis from the Atlantic provinces to the Prairie provinces.

Although the Prairies could presently enjoy a comparative advantage in grain, livestock, and petroleum related industries, there are still certain obstacles preventing the further exploitation of such an advantage. The Hall Commission (1977) and previous Royal Commissions have recognized this fact and have produced several recommendations such as changes in the freight rates and tariff reductions. If such changes are implemented by the Federal Government, it would be possible to hypothesize that manufacturing would proceed at a faster pace than at present, thereby enhancing Prairie (peripheral) natural resource advantages for manufacturing growth.

Innovation

Again much of the evidence supporting a peripheral advantage is to be found in the United States. The interrelation between innovation and urban industrial growth has already been outlined in the context of the birth of a firm (chapter 2). This interrelation could also be used to explain the growth of urban centres in peripheral regions. The employment and fiscal problems of large agglomerations in the United States and the resurgence of cities in peripheral regions, such as the south, have prompted some doubt of the ability of urban areas in central regions to generate sufficient innovations for their continued cumulative growth. In two relatively recent publications (Sternlieb and Hughes, 1975; and Lonsdale and Seyler, 1979), all the contributors sought to demonstrate the issue of metropolitan decline and inter-regional job shifts in the United StatesA.

Thompson (1975) found some scattered evidence to support the slow growth of the largest metropolitan regions and the phenomenal growth of southern regions which he claimed to be going through the industrial and the post-industrial age at the same time. To explain this trend, he proposed that manufacturing filters down through a national system of cities with the result that more industries are seeking smaller towns in the south. Until recently, these spin-offs have not affected the stronger cities in the north because they have continued to innovate and have replaced their loss. He suggested that now the older cities are not replacing industries as fast as they are losing them or industry is filtering-down faster and northern cities are not innovating quite as fast. A more plausible hypothesis is that industrial filtering is faster today because transfer costs are less important relative to the scale of the market.

Rees (1979) provided empirical evidence to validate his proposition of a causal link between the distribution of technology, intensive growth industries and regional shifts in the United States But, Rees was only able to show an increasing growth in the numbers of production-related workers of technology-intensive growth industries in peripheral regions, such as the southern states. No evidence was presented of the loss of administrative personnel in the north-east. More research would be required to determine whether the central regions are losing their control also over non-production workers. However, a trend that industrial R&D is reducing its dependence on large city regions, especially New York, has been pointed out by Malecki (1979). He showed that between 1965 and 1977 there was a major shift from some large north-eastern cities into their urban regions. But the decentralization was still within the centre.

A major participant of R&D, but often neglected, is government. Government-funded R&D projects conducted by private firms could influence the generation of innovation considerably, especially in peripheral regions. For the United States, Malecki (1981) has demonstrated that the main beneficiaries of government-funded R&D were the firms located along the Pacific coast and the southern states. This concentration has resulted in a cumulative agglomeration of electronic and aerospace firms in urban areas of peripheral regions. This finding reinforces the shifts in regional economic activities.

Within the Canadian context, there is no major evidence to support a regional economic shift due primarily to the generation of innovations. Most of the observations have been of the movement of firms from Montreal to Toronto and other centres as a result of political and cultural uncertainties (Toronto Star, 1979; Financial Post, 1980). However, Norcliffe (1975) has presented evidence supporting the decentralization of economic activities on the basis of where multilocational firms locate different parts of their operations. He subdivided these activities into:

1. processing of raw materials,
2. fabricating the processed raw material, and
3. integrating the fabricated inputs into further processing.

Fabricating activities are being moved out of the inner parts of large centres into the medium and small-sized centres within the centre and also into the periphery. If industries are beginning to prefer middle-sized cities of between 25,000 and 500,000 people, then the implication of such preferences could be considerable for Prairie towns and cities. Also, recent changes in the concentration of corporate control has been documented by Semple and Smith (1981). Although Toronto still accounted for most of the control, a group of western cities including Calgary, Edmonton and Winnipeg increased their level of dominance especially with regard to control in non-financial sectors. This group gained at the expense of Montreal.

Although government funded R&D could be used to reduce regional disparities, this strategy has not been consciously adopted in Canada. Cordell and Gilmour (1976) revealed that the distribution of federal research resources was not equally distributed between provinces, especially as it relates to R&D contracts with the private industry. Ontario obtained a lion's share of the research budget during the period examined. Apart from the bias toward Ontario and Quebec, Little (1974) also found that government funds were directed more at firms with high levels of R & D expenditures. As Malecki (1981) has shown concentration of government funded R&D could help foster the agglomerations of growth industries in peripheral areas.

Along with an apparent westward shift in income and product distributions, there is an indication that certain measures of innovative activities are also changing. In examining the patent output for the Prairies and part of the centre (Ontario)* between 1960 and 1978, it was discovered that there was a significant difference in the rate of change per annum of the patents granted in Ontario and the Prairies (Ajao and Ironside, 1981). The proportion of patents granted in the Prairies and in Ontario changed considerably during the period. Although an increasing number of patents was being granted in the Prairies their rates of change were more variable than Ontario. Also, Alberta in particular, showed a definite significant rate of change (at the 1% level of significance); it changed (increased) faster than Ontario and the other Prairie provinces.

The overall innovative tendencies that are being displayed indicate some unexpected changes in the traditional centre-periphery relationship in Canada. Although the Prairies may be gaining industries with established technologies, in the long-run, a seed-bed growth of new technologies may develop out of the current standardized production.

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*data for Quebec was not available

Government regional policy

In western developed economies, many attempts have been made to assess the importance of government regional policy such as those summarized in the report of the Centre for Urban and Regional Development (C U R D S., 1979) on the United Kingdom. But, it is not sufficiently clear whether government policy is succeeding in lessening the growth imbalance between the centre and the periphery. Whilst C.U.R.D.S. did agree that regional incentives were successful in creating manufacturing jobs, high unemployment rates still persist. The type of employment created (female labour) only increased the labour supply.

In Canada, the Federal Department of Regional Economic Expansion (DREE) exists for the sole purpose of reducing regional disparities, which occur in the form of employment and income.[*] The basic goal of DREE is to reduce regional disparities through the provision of jobs (Economic Council of Canada, 1977). Before DREE, several agencies, such as ARDA, FRED and the Area Development Agency, were established to tackle sectoral problems in agriculture and manufacturing industry. Those problems were severe in certain regions which resulted directly in attempts to reduce regional disparities through these agencies and their programmes. DREE was established in 1969, to coordinate the activities of the various government programmes dealing with regional economic expansion. One of its major policy tools is the provision of capital incentives to industry through the Regional Development Incentives Act (RDIA) and the General Development Agreements (GDA) signed with the provinces. Saskatchewan, Manitoba, and the region north of the 60 degree parallel in Alberta have been designated to receive assistance. Several Special Areas have also been designated. These areas have been chosen on the basis of their need for new or more comprehensive infrastructure. In Saskatchewan, Regina and Saskatoon have been designated. Other Special Areas on the Prairies include: The Pas, Meadow Lake and Lesser Slave Lake.

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[*] A major reorganization of a number of ministries was announced in early 1982. Two departments were created: Ministry of State for Economic and Regional Development (MSERD) and the Department for Regional Industrial Expansion (DRIE). The latter department is now responsible for the DREE industrial incentive programmes along with those formerly administered by the Department of Industry, Trade and Commerce. All the existing General Development Agreements and Sub-agreements will continue until their expiry dates. The new department (DRIE) is, also, responsible for the newly created Industrial Opportunities Program Board, which has been allocated a budget of $275 million for industrial innovation and development.

The expenditures of DREE on grants and contributions in the Prairies have been mostly in the form of direct assistance to private firms and businesses particularly in the rural sector. Between 1969 and 1977, over 250 projects were completed on the Prairies. These projects yielded about 9,000 direct jobs. As of the end of 1977, over 400 projects were still active which were to generate an estimated 9,000 jobs. Manitoba was the main beneficiary of the incentives where completed projects resulted in over 6,000 jobs. During the eight-year period the amount spent on incentives for the completed projects exceeded $50million. Total DREE expenditures in the Prairies increased from $50million in 1969-70 to over $100million in the 1979-80 fiscal year. But, the proportion of DREE's total budget spent in the prairies actually declined from 23% in 1969-70 to 17% in 1979-80. During the same period, the proportion of DREE expenditures in the centre (Ontario and Quebec) increased from 21% to 34%. The most notable increase was in Quebec - from 12% to 39%. Conversely, DREE expenditures in the eastern periphery, that is, Newfoundland, New Brunswick, Prince Edward Island, and Nova Scotia have been declining. About 51% of the total DREE expenditures were accounted for by the eastern periphery in 1969-70. Since 1977, the region received about 39% of DREE expenditures yearly.

The overall success or failure of DREE programmes on the prairies is hard to assess. Comeau (1969), Springate (1972), and Mellor and Ironside (1978) have expressed caution in establishing a direct relationship between incentives and location. The influence of DREE and other agencies on the life cycle of prairie firms will be considered in greater detail in later sections. The fact that DREE exists as a stimulus to peripheral growth, however, gives added credibility to the periphery-centre relationship.

C. Prairie Centre and Periphery Relationships

So far, the alternative periphery-centre relationship has been viewed at the national level. The forces which have been identified are also operating at the regional level. Within the Prairie context, the usual centre-periphery relationship is evident. Within the prairies metropolitan areas comprise the urban sub-system, that is, Edmonton, Calgary, Sastatoon, Regina and Winnipeg, and their hinterlands which include small regional cities. The key relationships leading to their dominance are market accessibility, the multiplier effect, economies of scale, labour advantages, transportation facilities, and corporate spatial structure. The discussion of these factors are largely inferential because most of the factors have not been empirically examined within the prairie context.

Market Accessibility/Potential

The powerful attraction of manufacturing industry to those areas of a region which are most accessible to the national and international markets, has long been recognized as an important factor in normative industrial location theory (Stafford,1972; Smith,1971). Although the advantage of market accessibility and market potential has been increasingly debatable (Cohen and Berry,1975), much empirical evidence has stressed its importance. Empirical studies such as those by Kerr and Spelt (1960), and Gilmour (1972), provide support for a centre-periphery relationship which related spatial variations in manufacturing growth at the national scale to variations in market accessibility, although none of the studies dealt specifically with Prairie centres. The traditional approach has been to cite assumed savings in transfer costs on shipments to finished products to consumers. Savings may be large where products are bulky, fragile, and perishable or where a plant's scale of output is large. In addition, the need for market proximity is still cited with great conviction by many firms (Rushling, 1974). A market oriented location is made more urgent by the need for maximum customer contact and information linkage if the firm is to compete successfully with its rivals for sales. Close and frequent contact is seen by many firms, especially smaller firms, as absolutely essential if sales and hence production and growth, are to be maintained or increased (Walker, 1977). In terms of sales maximization through close customer contact, the disadvantages of market inaccessibility may be substantial. It has also been argued that market accessibility is becoming even a more important consideration because of the increasing size of factories (Norcliffe, 1974). According to Norcliffe, this trend leads to a concentration of production at one or a few locations serving perhaps the whole national market, in place of a previous pattern of smaller factories.This increases market inaccessibility.

Applied to Canada, the market accessibility hypothesis suggests that manufacturing growth is concentrated in the central regions, and in the urban centres of the peripheral regions, which are favoured as market locations by the geography of demand, market potential (Ray, 1967), and by the spatial configuration of the country's key transport facilities.

The Multiplier

Central to the process of cumulative development in central areas (that is, urban) of a region is the multiplier concept, which postulates a direct impact on employment and income followed by a series of indirect effects in a chain-like sequence as expansion induced in one sector has repercussions on other sectors. The effect becomes less and less as distance from the original stimulus increases.

Several attempts have been made to document the multiplier effect of increased economic activity, employing methods such as, input-output and economic base analyses (Hamilton, 1967; Yeates and Lloyd, 1970; Mellor and Ironside, 1978). The study by Yeates and Lloyd is on the multiplier effects created in the southern Georgian Bay of Ontario by a federal government assistance programme. The direct and indirect multiplier impact of the assistance scheme was anticipated to create over 5,000 jobs, a $20million increase in payroll and a $1million increase to the local tax base in the long-run. The study also went further to consider the likely effect which the scheme would have on the functional structure of central places. It showed how the multiplier effect from increased industrial investment could be passed on, not only through manufacturing but also the retail and service sectors of particular settlements. Also, in a recent review of the pre- and post-assistance periods of the Georgian Bay, Cannon (1980), revealed that the incentives did have a substantial immediate direct effect on the volume and structure of regional manufacturing, both in absolute terms and in relation to trends in the provincial economy. But, Cannon argued that the programme failed to provide for a self-sustaining regional development. The assisted plants failed to develop significant local linkages. Ties were generated more with the United States economy, particularly because of the Auto Pact.

The key triggers to the cumulative growth in an urban area depend on the type of industry and ownership. Some economic activities exert a more powerful effect on development in an economic system than others. As Perroux stated, the propulsive industry needs to be large if is to generate sufficient direct and indirect effects, fast growing, have a high intensity of linkages with other industries or firms in order for the effects of its growth to be transmitted and it should be innovative (Perroux, 1955). An industry of this nature is likely to be the leader, the pole around which the economy clusters, but it does not necessarily follow that geographical clustering will occur. For manufacturing development, the locational impact of the linkage factor will depend upon such factors as the existing flow of inputs and outputs to local businesses and the overall importance of aggolomeration economies. Where both of these factors occur as within the urban areas, the locational pull will be strong (Gilmour, 1974). Even for industries where the high mobility of inputs and outputs encourage greater spatial dispersion, the importance of other non-material localization economies would tend to draw investment to established centres. In the case of the southern Georgian Bay area of Ontario, the new developments tended to favour existing higher order central places (Yeates and Lloyd, 1970).

Economies of Scale

One of the basic explanations for the concentration of manufacturing growth in large urban areas and their surrounding regions is that such areas offer firms significant economies of scale in production. Such agglomeration economies may be available to a wide variety of industries and firms because of urbanization or to a particular industry because of localization (Townroe, 1970). Agglomeration economies are defined in terms of the reduction in costs for a firm because of the scale of industry in a particular region and the sharing of some of the costs of purchasing inputs with others.

Specific agglomeration economies reflect the existence of industrial linkage, which is defined as occurring when one manufacturing firm purchases inputs of goods and services (including information) from or sells outputs to, another manufacturing firm. The most characteristic and important type of industrial linkage is where the sales and purchases involve semi-finished goods components, or industrial services which can generate highly specialized firms.

As explained by Weber (1929), scale economies offer a stimulus towards spatial agglomeration when it comes to deciding a location for new investment. However, scale economies do not increase forever; there comes a point when they begin to decline. With respect to a firm, more important initially is the concept of the threshold, defined as the demand necessary for a firm to function. In terms of the industrial development of an area, as the size of the area increases, it provides increasingly higher market thresholds enabling firms to operate. In the case of urban areas, Thompson (1965) described such a threshold as one:

> short of which growth is not inevitable and even the very existence of the place is not assured, but beyond which absolute contraction is unlikely, even though the growth rate may slacken, at times even to zero. In sum, at a certain range of scale ....some growth relationship similar to a ratchet, comes into being, locking in past growth and preventing contraction.[1]

The concept of the threshold has been used to describe the geographic distribution of manufacturing industries in Canada (Li, et al., 1978). Li et al., noted that industries which have a high threshold, in terms of the size of population needed to absorb their output, concentration are located in major urban centres so as to optimize access to markets, whilst those industries with low thresholds are prevalent in non-central regions. This finding was earlier established by Appana (1975) in his study of Prairie manufacturing. The threshold concept, therefore, reinforces the significance of the filtering-down of industries hypothesis.

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[1] Thompson,1965,p.22

In general, empirical investigation of the extent and importance of economies of scale as an explanation for the above-average central region or urban manufacturing growth in Canada has taken one of two forms. First, many studies have adopted a micro-level approach, gathering data on linkage relationship from samples of firms in particular central areas (Gilmour,1974;Britton,1974,1976). Second, some studies have investigated the extent and importance of industrial linkage in industries through a macro-level manipulation of aggregate published statistics (Czamanski,1974). The strength of the industrial linkage in the urban areas of peripheral regions is reinforced by studies which have been carried out on manufacturing linkages within peripheral regions such as the Prairies. Studies such as those by Barr and Fairbairn (1975) and Wright (1962), have demonstrated a certain amount of inter-urban linkages, but they have also shown that there is a high dependence of peripheral firms on firms located in central Canada and the United States.

Labour Advantages

A fourth determinant of the cumulative manufacturing growth in urban areas is the labour supply advantage which they enjoy in terms of quality and skills. Myrdal's (1957) seminal inter-regional economic growth relationship, postulates that the selective migration from the periphery of the more enterprising and higher quality workers to the centre is one of the key relationships explaining cumulative industrial growth of the latter.

Labour quality is difficult to measure objectively, but two types of evidence provide some support for this argument. The first are statistics on measurable labour quality indices such general educational attainment and rates of absence from work (Economic Council of Canada, 1977). Although in the Council's study, the Prairies fared better than other peripheral regions, labour quality, in terms of the number of people enrolled in educational establishments, was found to be higher in Ontario. The second type of evidence on regional variations in labour quality is that provided by surveys of manufacturing firms which have moved from the centre to the peripheral regions. The significance of this evidence is that the firms are in a position to compare their direct experience of the labour force in the two types of location (Springate, 1972). The labour force in the peripheral areas is usually preferred.

In terms of skill differentials, the success of urban centres in attracting modern growth industries, their innovatory leadership and their dominance of national decision-making, have resulted in turn in a concentration of three types of skill, significant for continuing manufacturing growth. The first is production skills in modern science-based industries. The early concentration of innovation and development in these industries in urban centres now means that these areas possess an above average concentration of skilled and semi-skilled workers (Economic Council of Canada, 1977). A second type of skill which is represented in the urban centres' work force is that possessed by research scientists and technologists. This bias reflects the concentration of industrial and government research laboratories in these centres. Analyses of such concentrations in other central areas have been provided for the United Kingdom by Oakey (1979) writing on industrial innovations and for the United States on government funded research and development by Malecki(1981). Whilst the former analysis tended to reinforce the advantage of south east England, the latter analysis provided support for the shift from old central regions to the 'sun' belt. Implications of Malecki's findings will be pursued further with respect to the alternative periphery-centre relationship.

The urban centres' remarkable concentration can itself be explained by its attractiveness in terms of information linkages, national and international accessibility, and its dominance as a location for Canada's research-oriented modern growth industries. The concentration of research skills could result in a higher entrepreneurial innovation rate than in the peripheral areas, with all the implications this has for manufacturing growth.

Transport Facilities

Interrelated with the other determinants of the centre-periphery relationship of manufacturing growth is the nature of Canada's transportation network. The impact of the railway upon the development and location of Prairie manufacturing is the result of the construction process and the freight rate structure. According to Gibson (1965):

> Commitments which were made prior to the present century have a bearing on the solution of the problems which confront us today.

The initial reason for building the railway across the Prairies was to forestall American trade and territorial penetration of the North West. The admission of British Columbia into the confederation in 1871 finally led to the construction of the railway. Subsequent building of feeder lines throughout the Prairies was motivated by the rapid agricultural expansion and the need for efficient transportation of grain to central Canada. Apart from the boost to Prairie manufacturing in general, the railway had a bigger effect on the growth of central Canada. It provided markets for eastern Canadian manufactured goods and raw materials for manufacturing industries located there.

The initial advantage of central Canada has been further strengthened by the structure of the freight rates. In order to facilitate the construction of a railway line through the Crows Nest Pass, an agreement was made between the Dominion Government and the Canadian Pacific Railway Company in 1897. The government agreed to subsidize the line in return for a freight rate reduction to all points east of Port Arthur. In addition, the rates on various commodities from central Canada west-bound were reduced (Currie, 1967). Freight rate changes on manufactured goods were still higher in comparison to those on raw materials. The general policy of low freight rates levied upon Prairie exports, especially wheat, and higher rates for goods imported into the Prairies is still a feature of transportation on the Prairies.

Although the higher freight charges on goods imported into the Prairies have encouraged industrial development and served as a protective barrier for infant manufacturing industries (Wilson and Darby, 1968), the low freight rates on grain exports have had an adverse effect on the comparative advantage which the Prairies would otherwise enjoy in the development of secondary manufacturing industries such as those based on flour, rapeseed, livestock and malting (Hall Commission, 1977).

Apart from the freight rates and the high transportation costs as a consequence of great distance from input sources (central Canada), small local markets have been the limiting forces in Prairie manufacturing development. In general, Bellan (1968), noted that the greater proximity of central Canada firms to raw materials, such as chemicals and textiles from overseas, coal and steel from the United States, together with their location in the midst of Canada's largest concentrations of population, severely limited industrial expansion in Prairie cities because of their competitive advantage.

Provincial Government Policies

It is possible to postulate that the alternative periphery-centre relationshp cannot be applied yet to the Prairies, because the various determinants leading to the cumulative growth of the prairie cities are still strongly in effect. In recent observations on the Alberta economy, Barr and Fairbairn (1978), attested to the dominance of Edmonton and Calgary in the Alberta economy. Together they accounted for 56 percent of the total number of manufacturing establishments, 68 percent of value-added during manufacture, and 66 percent of the selling value of shipments. Contributing to such manufacturing concentration is the observation of Appana that the trend on the Prairies seems to be in the form of a westward shift of manufacturing distributions, that is, from Winnipeg to Edmonton and Calgary (Appanna, 1975).

The manufacturing dominance of these centres will be illustrated further in the next section. Significantly, however, this dominance has encouraged Prairie governments to formulate policies which promote manufacturing decentralization. Such government policies could reduce the imbalance within the Prairies, through a filtering-down of industries to rural centres.

Nevertheless, Prairie government policies are promoting both the alternative centre and periphery frameworks since all the governments attach importance to the attraction of industry to urban areas, the decentralization of economic activity and the promotion of the rural 'stay-option'. Among their activities can be cited the provision of assistance of one kind and another: tax concessions; loans; grants; market studies; and the provision of advisory services and technical help. In Alberta, the major programme designed to promote decentralization is administered by the Alberta Opportunity Company (AOC), which was established in 1972. Although the programme is oriented toward the development of small industrial firms in rural centres, it is also designed to encourage improved technology. The forms of assistance provided include capital loans, working capital loans, inventory financing, loan guarantees, and management counselling. In 1979-80, 89% of the $38.4 million loaned went to rural towns of under 10,000 population (AOC, annual report, 1980).

Manitoba has developed more comprehensive assistance programmes. The Manitoba Development Corporation (MDC) provides loans for exports; Design Improvement Assistance, through grants, is given to small firms; a Product Research and Design Program which is also sponsored by the Federal Government and aimed at small medium firms, is focused on improving overall technology; and the Enterprise Manitoba programme is aimed at general manufacturing growth in rural as well as some urban areas.

The Saskatchewan Economic Development Corporation (SEDCO) established in 1963 provides a large proportion of the assistance to nearly all industrial sectors in Saskatchewan. Manufacturing has been given a higher prominence since 1978. Until 1975, most of the loans were made available to firms in Saskatoon and Regina. Since then, the proportion of loans given to small cities and rural centres has increased and surpassed the amount granted to the two metropolitan centres. There are also small industry development, product development, export development, and management programmes. These are administered by the Department of Industry and Commerce.

In the field of transportation, which the provinces feel has been detrimental to the development of those industries with comparative advantage, continuous pressure has been put on the Federal government to alter freight rate policies . The position of the provinces at the Western Economic Conference in 1973 and their support of the Hall Commission (1977) are examples of this pressure.

Conclusion

The scattered evidence reviewed to support a shift in the balance of manufacturing activity toward the periphery has raised a number of questions. A primary question is whether the shifts will be of a long-term duration or are they just short-term fluctuations. For the short term, at least, there are many drawbacks to the periphery especially with regard to employment, economic stability and the influence of external control. These considerations suggest the following questions:

1. What types of jobs are being created? Are they low skilled? Would manufacturing employment peak too soon as a result of changing technology?

   In regard to the last question, Cromley and Leinbach (1981) advocated that manufacturing employment has already peaked in parts of the southern USA. Most of the employment that is being generated is in the service sector.
2. Is there a growing external corporate control which could lead to further standardized production and instability? If so, could this external control be due to the inability of the prairies to develop indigenous entrepreneurship?
3. Are the new firms more susceptible to bankruptcy, thereby making the region more volatile?
4. Is there any difference in the growth rates of different sized firms? Are the larger firms growing more slowly or faster than small to medium sized firms? This is particularly important for the direction of government incentive programmes.

D. Prairie Studies

There are no studies on the prairies discussing patterns of change in the manufacturing sectors interrelated with the factors outlined in the discussion of the periphery-centre relationship. Various attempts have been made to analyze the economy of the prairie provinces (Caves and Holton, 1961;Seifried, 1981), individual provinces (Seifried, 1978), and individual centres (Barr and Fairbairn, 1978). Caves and Holton traced the development of the prairie provinces since confederation. An emphasis was placed on the impact of the wheat and oil booms on the growth of the prairie economy. The authors concluded that the Prairie provinces' "manufacturing complex has remained that of an area which produces primarily for the local market".Even with such exceptions as new mineral discoveries, they asserted that the prairies seem destined to remain essentially agricultural. Barr (1972) has also considered the reorganization of the prairie economy since 1945. His proposition was that the prairie economy would not change until natural population increase provides a sufficient market to support a sustained manufacturing industry. Both conclusions are only partially convincing in that the provinces are no longer totally dependent on agriculture, and the lack of local markets has not inhibited manufacturing development since most of the demand for prairie production has been externally stimulated. In addition, a local market is not the only pre-requisite for sustained manufacturing.

Since the Caves and Holton study, research interest has focused on the development of the mineral resources and their effects on manufacturing growth. Studies in Alberta have emphasized the role of the oil industry (Drugge, 1969, Hanson, 1966; Shaffer, 1976; Barr and Fairbairn, 1978; Kubinski, 1979), material flows between the economic sectors, and changing industrial composition (Anderson, 1968; Leigh and Carter, 1972; Seifried, 1969 and 1978; Smith, 1962). In Manitoba, research into manufacturing has tended to focus on general regional development (for example, Manitoba Economic Development Advisory Board, 1975 and 1976; Seifried, 1973). In addition, specific studies on Winnipeg's urban growth have been carried out but they are mainly historical.

The only comprehensive examination of industrial location on the Prairies was undertaken by Appana (1975). He found that factors influencing industrial location depended upon the geographical scale considered by decision-makers within firms. The entrepreneurs investigated were influenced by the desire to have close access to markets at both the prairie and provincial scales. At the community level, the entrepreneurs showed preferences for contact linkages, taxes, premises and personal considerations. The internal organization and operating policies of large enterprises also affected the location of industries. In addition, product diversification and complementary production processes in separate facilities aided the spatial proximity between branches and the main enterprise operations. Appana's findings do lend some support to the filtering-down process, but they do not indicate the changes and the reasons for the long-term growth patterns of prairie firms and industries.

A recent attempt was made by Seifried (1981) to summarize the effects of new manufacturing firms on regional development. He confirmed the findings in other studies that both slow and rapid growth industries had large numbers of entries during the period examined (1962-1971). On the one hand, food and beverage and wood products industries had large numbers of entries but slow employment growth. On the other hand, the printing, metal fabricating and transportation equipment industries experienced not only large entries but also had rapid employment gains.

E. Aspects of Prairie Manufacturing

During the last three decades, there has been a marked increase in the total number of people employed in the manufacturing industry of the Prairie provinces. In 1956, 106,783 people were employed in manufacturing industry. By 1975, the figure had increased to 138,901 (Statistics Canada, 1975). On a provincial basis for the same period, total employment in manufacturing increased by 19%, 28%, and 42% for Manitoba, Saskatchewan and Alberta respectively. The increase in the number of people employed in manufacturing has also been accompanied by a shift from the primary to the secondary and tertiary sectors, but there are some regional variations in industrial structure. Data for 1970-73 indicate that employment in the primary sector was much greater in Saskatchewan than the two other provinces (Economic Council of Canada, 1977). The Council calculated that 31% were still employed in agriculture in Saskatchewan, as compared with 14% and 18% in Manitoba and Alberta respectively. During the same period, 33%, 21% and 28% were employed in the secondary sector in Manitoba, Saskatchewan and Alberta. The tertiary sector employed 53%, 38% and 54% in the three provinces.

Despite the variations in industrial structure between the provinces, the growth of manufacturing has comprised an important part of the expansion and broadening of the economic base of the prairie provinces. The composition of manufacturing industries in the three provinces is somewhat dissimilar, because Alberta has followed a different path from that of the two other provinces since the major oil discovery at Leduc in 1947.

In 1975, the first five leading manufacturing industries, as ranked by value of shipments of 'own manufacture' in the prairie provinces were slaughtering and meat, dairy products, agricultural implements, pulp and paper, and feed industries (Statistics Canada, 1975). In Manitoba, pulp and paper was not among the leading five. Instead miscellaneous food ranked fifth. Petroleum refining, and publishing and printing attained the first and fifth ranking in Saskatchewan, whilst food, and pulp and paper attained lower rankings. In Alberta, the five leading industries were slaughtering and meat, petroleum refining, dairy products, non-commercial trailer and animal feed. Of the prairie metropolitan cities, Winnipeg, Saskatoon, Regina, Calgary and Edmonton had the highest value-added in manufacturing (Statistics Canada, 1974).

When manufacturing in the Prairies is measured by the number of establishments, the dominant industry groups are: food and beverage; printing, publishing and allied; wood; metal fabricating; and miscellaneous manufacturing. In 1975, these industries had over 2,000 establishments with a total employment of over 70,000 (Statistics Canada, 1975). For all prairie manufacturing industry, however, the number of establishments declined from 3,985 in 1965 to 3,689 in 1975. Manufacturing establishments in Manitoba and Saskatchewan decreased by 17% and 13% respectively, but Alberta experienced an increase of about 3%. The five major cities had a total of 2,381 establishments in 1974 (Statistics Canada, 1974). In terms of the stratification of employment by establishment, all the five cities in 1974, were characterized by establishments employing between 1-100 people. Only Edmonton and Winnipeg had more than five establishments employing between 500-1,000 people each.

The remaining characteristics of prairie manufacturing to be discussed are the ownership structure and type of organization. In 1972, the percentages of foreign-owned establishments in Manitoba, Saskatchewan and Alberta were, 11%, 8%, and 11% respectively for all manufacturing activity (Statistics Canada, 1974). On an industry group basis, foreign-owned establishments in 1972 were prevalent in the primary metal, paper and allied, electrical, chemical and chemical products, and petroleum and coal product industries. Many of the sectors in these industries are characterized by routinized production processes and are indicative of the later stage of the filtering-down process.

In terms of the type of organization, incorporated companies dominate. In 1975, between 75% (Saskatchewan) and 85% (Alberta) of the total manufacturing establishment were incorporated private companies. Between 9% (Alberta) and 16% (Saskatchewan) of the establishments were individual ownerships (Statistics Canada, 1975).

In summary, recent data from Statistics Canada show that the wood, metal fabricating, non-metallic products and petroleum related industries, and the location of most manufacturing, whether measured by value-added or number of establishments, are dominated by the five metropolitan cities of Edmonton, Calgary, Saskatoon, Regina, and Winnipeg. Clearly, a strong centre-periphery framework exists within the prairie region with each major centre dominating a sub-regional periphery in terms of manufacturing industry.

F. Change Differentials in Selected Manufacturing Industries

In the context of the data presented above and the proposition of a periphery-centre shift within Canada, the following analysis represents an exploratory search for any uniformity in the growth patterns of manufacturing industries in a peripheral region, that is, the prairies. A comparison of these patterns with a central region (Ontario) will be made. The industries chosen for this analysis were selected on the basis of availability of data for some of the factors promoting peripheral development, namely:

5. The significance of the industries to the economic base of the prairies, as measured by the value of shipments and the number of establishments in each industry.
6. The technological output of the periphery's industries as indicated by the number of patents granted to these industries and assigned to the firms that belong to them.

The following 2-digit Standard Industrial Classification (SIC) industries as used in the United States were identified based on the above criteria, that is, they had the highest values of shipments, establishments, and were granted the largest number of patents:

lumber and wood products
rubber and plastics
fabricated metal products
machinery
electrical

transportation

The first step involved assembling annual data from Statistics Canada on the number of establishments, production, and total employment, value of shipments, value-added, product and total wages of nine manufacturing industrial sectors for the period 1960 to 1978 within the above industries. Several limitations were placed on the accumulation of the data for a longer period. The collection of aggregate statistics only started for many of the industries in 1960. Even the Prairie industries for which data were available for a longer time were aggregated with British Columbia or the Maritime provinces. Missing data were also encountered for some of the prairie sectors because the number of establishments were too few for disclosure. The following 4-digit SIC sectors (members of the 2-digit SIC listed above) were finally selected:

1. (SIC 3441) fabricated structural metal
2. (SICs 3446,3442,3448) ornamental and architectural metal
3. (SICs 3465,3466,3469) metal stamping
4. (SIC 3499) miscellaneous metal
5. (SIC 3523) agricultural implements
6. (SIC 3590) machine shops
7. (SIC 3599) miscellaneous machinery
8. (SICs 3069,3079) plastics fabricating

The seven variables (production employment, total employment, establishments, value of shipments, value-added, production wages and total wages) were chosen to illustrate the structure and the development characteristic of the above manufacturing industries during their initial stages of evolution in a peripheral region compared with these manufacturing industries in a central region at a different evolutionary stage. These are all the variables for firms for which data are collected by Statistics Canada. The time series analysis performed on the variables, which been been logarithmically transformed, displays an orientation toward a slightly cyclical behaviour. Time, measured in years, has not been transformed. Only the transformed data sequence is used for this analysis, since the time period is too limited to make long-term statements about trends. In other words, the fluctuations evident in the time series plots (for the sectors with complete data) have not been smoothed out because the time period does not warrant the application of moving means. An attempt was made, however, to determine whether the rates of change were significant and whether differences could be found between the provinces. For this, a linear regression analysis was used to determine the strength - coefficient of determination (r^2) and the direction - correlation coefficient - (r) of the relationship. Further explanations on the regression statistical procedure are provided in Appendix A. The dependent variables (establishments, wages, employment, value of shipments and value-added) were logarithmically transformed. Time (year) was not transformed. The dependent variables were regressed on each of the 19-year periods:

$$\ln y = \ln a + bX$$ (Yeates, 1974:p 81)

y = variable e.g., employment

a = intercept.

b = coefficient, (slope of the line) which indicates the relative rate of increase or decrease or the rate of change per unit of y (e.g., employment) per unit of x (year).

x=Time (year)

The results of the regression analysis are shown in Tables 3-10.

In examining the results of the sample of prairie manufacturing industries, it should be borne in mind that they provide no support for the universal applicability of Kuznets' expectation of progressive retardation after an early period of rapid growth.[1] Neither do they support Gold's finding that growth rates in rapidly growing industries do not vary widely (Gold, et al., 1968). In fact, the 19-year time interval covers the industries' early period of evolution on the prairies. All the variables indicated an upward trend, although wide fluctuations occurred, especially in firm establishments, production and total employment. In other words, a general feature is that the industries grew markedly during some years and also declined very sharply at other times. The findings may be summarized as shown in Figure 3.

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[1] The period or rapid growth before the advent of secular movements identified by Kuznets varied from between three to twenty-five years.

As a result of this growth pattern, the 19-year time interval was disaggregated into three periods: 1960-66 (early), 1967-73 (middle), and 1974-79 (late) for analysis. This crude delineation is based on the cyclical pattern evident in the time series plots. The periphery's industrial sectors showed a different pattern from that of Ontario. The Prairies grew more rapidly in all the manufacturing sectors than Ontario, but often downward trends were simultaneously accompanied by an upward trend in Ontario and vice versa. Changes in Ontario were gradual, whereas the periphery showed very wide fluctuations, especially during the middle period (1967-73). Manitoba and Ontario began the 1960-66 (early) period with a slight decrease for all the variables. Within the periphery, Manitoba and Saskatchewan exhibited wide fluctuations. Saskatchewan experienced the most rapid and largest rate of change on almost all the variables. Alberta rose very sharply in the late period. The increases were most pronounced in miscellaneous machinery. The pattern of each sector, with particular emphasis on the rate of increase or decrease (b), is discussed below.

Agriculture:Saskatchewan experienced the most rapid rate of change on all the variables, followed by Manitoba, although the rate of firm formation was greater in Alberta. Ontario was the slowest to change, and it exhibited no significant employment change.

Machine shops: Ontario experienced higher increases in value of shipments but Saskatchewan changed most on the other variables. Manitoba actually showed a decline in its rate of firm formation during the 19-year period.

Ornamental and Architectural metal work, 1960-69:[1] The increases in establishment were greatest in the prairies. Manitoba changed most rapidly. Wages rose sharply in Manitoba and Saskatchewan.

Metal doors, sash, frames, mouldings and trim: Alberta surpassed the other provinces during the middle and late periods. It experienced a very high rate of increase in wages and production employment.

Prefabricated metal buildings and components: Continuous moderate rate of change for Ontario. Both Saskatchewan and Manitoba had significant decreases in the number of establishments, but they experienced rapid increases in value-added and value of shipments.

Fabricated structural metal: Ontario and Manitoba were more alike in their slow rate of change compared with Alberta and Saskatchewan. The latter two provinces grew rapidly on all the variables, especially in wages and value-added.

Metal stamping-sheet metal work: Wages, value-added and value of shipments increased rapidly in Saskatchewan and Alberta. Steady increases were experienced in Ontario.

Metal stamping (n.e.s): Alberta again showed high rate of increases in wages, value-added, and value of shipments. Ontario showed hardly any change.

Miscellaneous metal fabricating: Highest increases in

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[1] SIC 3446 was reclassified into SICs 3442 and 3448 in 1970.

Alberta on all the variables. Ontario was steady.

Plastics fabricating:Complete data were available on establishments only. Alberta and Saskatchewan had the highest rate of new firm formation.

Miscellaneous machinery: This sector contains the oil and gas production equipment manufacturers. Alberta had the highest rate of new firm formation, value of shipments and total wages. But, it is interesting to note that it was not significant on the rate of change of employment and value-added. The lack of significance of the latter variable may indicate the dependence of the province on imported components and the standardization of production.

Summary

A general conclusion is that the timing and direction of increasing and decreasing growth trends tend to be similar among the prairie industries, especially, in Alberta and Saskatchewan, whilst the Ontario industries seem to differ slightly. Overall, comparison of the findings between the growth patterns of Ontario and Prairie industries, reveals that the latter group have been growing faster but that their rates of change are more variable from year to year than the rates of change of the Ontario industries. Therefore, within the context of the periphery-centre concept, the trends discussed above provide some support for the concept. The trends at least illustrate the beginning of a shift in the spatial balance of growth within the nine (eleven when sic 3446 is disaggregated) manufacturing sectors. The aggregated linear analysis presented above has raised a further question:

Has prairie manufacturing grown in relative terms because of technological change, shifts in the structure of income payments, changes in the structure of final demand, or a combination of these factors plus the behaviour of the firms?

While it is possible that the factors raised in the question could be responsible for prairie manufacturing growth, it is pertinent to initially examine the decisions of individual firms before offering explanations on aggregate pattern.

IV. METHODOLOGY

The last chapter offered some insights into the industrial environment in which Prairie manufacturing firms operate. However, the examination of published and aggregate data for industries does not provide sufficient information on the decision-making of firms with different ages. The previous analysis indicated the 19-year changes of the industries on a number of selected economic indicators such as the value of shipments, the total number of employees, and the total value of wages. But if a goal is to identify instrinsic locational advantages for prairie firms, as in the case of this study, they will only be detected by an examination of the behaviour of individual firms and not through an examination of the movement of industries. In particular, the goal of this study is to examine factors such as the investment and locational decisions, which underly, produce, maintain or change the behaviour of firms in growth industries in different development phases in different locations. An approach relying solely on aggregate data at the scale of industries whose behaviour represents the sum of the behaviour of their constituent firms would not accomplish this goal.

The method chosen to accomplish the goal of this study, and which is derived from the conceptual framework extensively developed in Chapter Two, is the primary investigation of firms based on factors which underly, produce, maintain or change their behaviour at different development phases. The key factors to be examined are initial location factors (that is, factors responsible for the establishment of the firms), growth strategies, subsequent location decisions, and constraints on growth.

In order to obtain a more precise classification of a firm's development phase, especially with regard to not only a firm's physical age (chronological age) but also the nature of the firm's operations, it is necessary to consider factors such as the size of sales (revenue), level of profits, size of labour force, and the technology (age of products). Operationally, there are several limitations in using any of these factors to delineate a development phase. Firstly, private firms are very reluctant to divulge any information about the value of their sales and profits. Secondly, there are no set standards as to the size of sales, profits and the number of employees for delineating firm development phases. The use of product age as a determinant of a development phase is more plausible because data on products and production processes are readily available. However, the product age factor is left indeterminate initially, because the product may or may not be based on a legally patented innovation to which a definite age could be attached. Innovation is defined as the whole process of converting inventions (new products, ideas, processes) into full-scale productive operations. If the product is based on a recently patented innovation, then the initial premise is that a newly established firm (young firm) is producing a young product. But, since not many firms are established to product new products (as documented in Chapter Two), the age of the product is initially assumed to be indeterminate. Operationally, however, it is necessary to use a measure of innovation to target the population of firms that would satisfy the objective of examining firms of different ages, and as a means of establishing for subsequent data analysis, the age of the products of the firms. In order to establish a measure of innovation, variables indicating the input and output of the innovation process needed to be considered. These variables include expenditure on R & D, research personnel (input variables), and patents (output variables). All three lack definitional clarity and in the case of the first two variables, accessibility to data is often difficult or impossible. The propensity to patent differs considerably between firms. Many firms may simply choose not to patent but to obtain a quick lead in the market for the new innovation. This strategy avoids the need for public disclosure which is mandatory with patent issues. Also, the economic significance of the patented invention is variable. This significance is not reflected in the patent issues. Mueller (1966) and Mansfield (1968) have sought to unravel the problems of measurement of innovation. Both writers found that there is a high positive correlation between R & D and the incidence of patenting.

In the Prairie context, data on expenditures on R & D are not made available except by publicly incorporated companies, but there are very few of them. In view of the lack of data, patent issues were the only operational measure to use.

By employing patent issues, definite ages can be attached to the products, thus ensuring that the population of firms is drawn from growth industries where rapid technological changes are occurring. The focus of this study is centred on growth industries. It has already been suggested that innovations tend to occur in growth industries with competitive pressures and where rapid technological advances are already taking place. (Pred, 1977. If this is true, then it could be expected that firms with product of different ages will be found in the growth industries. Therefore, for the purpose of this study, industries with a high incidence of patenting constitute the population of firms from which a sample is drawn. The high incidence of patenting is also assumed to indicate that there are other inputs and outputs, such as research and development expenditures, to the innovative process of the firms belonging to the industries. This can only be ascertained, however, if firms are drawn from the patent records as well as from other listings of firms that belong to the identified industries. Since not all firms with innovative products would appear in the patent records, for the ultimate data analysis, by classifying firms on the basis of the length of time their products have been on the market, it is possible to establish also a population from which to sample firms which do not appear in the patent records.

The development phases, based on the age of the firms and their products, are used primarily as a taxonomic base for assessing the behaviour of prairie manufacturing firms. The phases were not formally established prior to the primary investigation which focused on a series of questions involving the following key factors: location decisions (initial and subsequent), firm goals and growth strategies (including innovation and government influence), and growth constraints. Extensive discussion has already been provided on the key factors in the conceptual framework. These factors constitute the key variables on which the hypotheses of this study were based and for which data were sought from the selected firms.

Research Hypotheses and Data Requirements

The scale of the subject matter prevents the postulation of traditionally tight, quantitatively expressed hypotheses. However, it is possible to state the nature of the findings expected prior to the start of the pilot survey. The literature review pertaining to the variables on which the hypotheses were based was presented in Chapter Two.

Hypothesis One - Initial Location

There are significant differences in the initial location factors of firms in various development phases in different levels of centres.

This hypothesis is partially based on previous studies relating to the various factors (innovation, production familiarity, desire for self-employment) responsible for the birth of a firm (e.g. North, 1974). But the studies did not consider the possible differences between firms of different development phases located in different levels of centres. It is assumed that factors e.g. inventions, which lead to firm establishment are variable from location to location. Since inventions are usually concentrated in large urban centres, it is to be expected that firms (at a particular development phase) whose creation were based on invention would be more predominant in the large urban centres than in the regional centres. However, other factors responsible for initial location, such as experience in manufacturing, previous employment, market conditions of the areas at the time to establishment, were included in the series of questions needed to support the hypothesis. Other questions on structure, founding characteristics, ownership type, legal structure and the nature of corporate control were included. An entrepreneur would necessarily have to consider these factors once the decision has been made to establish a firm. This hypothesis is advanced to fulfill part of the overall objective of the thesis: an examination of factors which underly and/or produce the behaviour of firms.

Hypothesis Two - Goals and Strategies

There are significant differences in the goals and growth strategies of firms in different development phases in different levels of centres.

As developed in Chapter Two, growth is assumed to be a major objective of a firm. In traditional economic theory, the sole objective of the firms is profit maximization but this theory of firm growth is not a particularly satisfying explanation in a contemporary setting of corporate organization, diversified production, rapid technological change and entrepreneurial 'satisficing behaviour'. In view of the narrowness of the profit-motive theory, several other factors would have to be incorporated.

The concept of strategy, defined as the determination of the basic long-term goals and objectives of a firm and the adoption of courses of action necessary for their attainment. is presented with particular reference to product development, research and development (R & D), innovation, and government assistance. If technical competence was regarded by the firms not to be a barrier to innovation, then other factors, such as the type of corporate structure and the availability of government incentives might affect the ability of the firms to introduce some new technique or product. It was assumed that government programmes had an impact on the innovative performance of the firms.

In developing the second hypothesis, it is assumed that firms at different development phases would have different goals and different growth strategies to fulfill them. There have been several studies on growth strategies as shown in

Chapter Two. In addition, the studies of Aharoni (1966) and Bower (1970) provide extensive coverage of growth strategies, especially in relation to investment decisions. However, none of the studies have examined growth strategies from the viewpoint of firm development phases. Both Aharoni and Bower present the investment decision process as a series of steps involving a desire to change existing operations through for example, investments in new equipment, plant, new products or new markets. In real life, steps are not well-defined and may not occur in any pre-set sequence. In fact, as a premise to the hypothesis stated above, it is assumed that the growth strategies (including investment and locational decisions) are complex and are based on the history of the firms, and the entrepreneurs in the decision-making process. To fulfill the hypothesis, necessary information on the investment history of the firms was required. Overall, the second hypothesis is aimed at fulfilling a part of the main objective, that is to examine factors which underly, produce and/or maintain the behaviour of firms at different development phases.

Hypothesis Three - Location Decisions

There are significant differences in the type of location decisions made by firms in different development phases in different levels of centres.

The various types of location decisions made were discussed in Chapter Two. The above hypothesis is aimed at illustrating the extent to which entrepreneurs re-evaluate locational advantages in conjunction with their investment decisions in different development phases. There are extensive studies as to why firms relocate or expand on their existing locations (e.g. Townroe, 1976, 1979; Keeble, 1976, 1979) but none have distinguished between location decisions of firms of different ages in different levels of centres. Field investigation is required to answer questions on what type of location decisions are made, why and when are they are made. Essentially, this hypothesis is complementary to the second hypothesis, because investment decisions are reflected spatially, especially when decisions are made to establish a new plant or relocate to a new location. The third hypothesis is formulated to find out the reasons underlying the spatially oriented investment decisions. North (1974) has already indicated the various reasons underlying location decisions of four sectors within the plastics manufacturing industry. But, North's analysis was on one industry and no reference was made to the development phases of the firms. The third hypothesis is also designed to fulfill the part of the overall objective involving the factors which change the behaviour of firms.

Hypothesis Four - Constraints

There is a significant relationship between the type of growth constraints or stresses experienced and the development phases of firms located in different level of centres.

As detailed in Chapter Two, firms experience different types of constraints or stresses during their development process. The concept of stress refers to any influence which interferes or threatens to disturb a firm's desired equilibrium. The locational aspect of stress refers to any disturbing influence on the firm's operation at its existing site. Combining both the locational and the economic constraints makes this hypothesis unique. Evidence available on the effects of constraints on firm growth has usually been economic (Steed, 1971) or locational (Lloyd and Dicken, 1979). In support of the above hypothesis, studies which have analyzed the investment decisions of firms, such as Aharoni (1971) have shown that older firms tend to operate on a principle of risk avoidance and therefore, are less likely to encounter stresses that would undermine their equilibrium. But, there is no empirical evidence to support the type of stresses faced by firms of different development phases as defined in this study. Finally, the fourth hypothesis is aimed at fulfilling another part of the overall objective: to examine factors which change or maintain the behaviour of firms.

In general, the evidence required to support the four hypotheses is interrelated since the hypotheses are designed to fulfill one overall objective: to examine factors which underly, produce, maintain or change the behaviour of firms at different development phases. The techniques of data collection, the choice of technique, the sample design, the interviews, call-back questionnaire survey design, and the responses to the survey are discussed below. Emphasis is placed on the choice of technique, the sample design and the questionnaire design. Advantages and limitations of the survey instruments used are also discussed.

Sample Design

(i) As a first step in designing the sample of firms, two main criteria arising from the overall objective were taken into account:

(a) Identification of those manufacturing industries leading the development of prairie economy ('growth industries') in terms of the value of shipments and total employment as discussed in Chapter Three.

(b) Identification of those industries with a high incidence of patenting.

The latter factor was established by an examination of patent records from 1969 to 1979. Over 85% of the inventions which have been patented and assigned to firms located in the prairie centres have occurred in growth industries (Patent Office Records, 1969-79). No attempt was made to classify the inventions by individuals, mainly because of the difficulty in tracking down the large number of inventors involved and the fact that the inventions assigned to firms were more likely to be developed on a commercial basis than those granted to private individuals.

Several difficulties were encountered in compiling the innovative (patent) list of companies and assigning the inventions to the Standard Industrial Classification. The main difficulties were related to the Patent Office method of industrial classification which has no resemblance to the Standard Industrial Classification (SIC) or even the Statistics Canada SIC. In addition, the Patent Office changed its method of reporting the weekly issues in 1975 by eliminating the address of the inventor. However, a rough but incomplete list of centres of origin of the inventions from 1975 to 1979 was obtained from the federal Department of Consumer and Corporate Affairs. The list also eliminated the short description of claims for inventions. The claims are useful for classifying the inventions into different types of new technology and into the appropriate industrial category. For the period 1975 to 1979, the inventions assigned to firms were classified only on the basis of the most important SIC to which the firms belong. Therefore, the industries chosen for this research were selected on the basis of the following primary factors:

1. The technological output of the industries as indicated by the number of patents assigned to the firms belonging to these industries.
2. The significance of the manufacturing industries to the economic base of the prairie provinces, as measured by the value of shipments and the number of establishments in each industry (reported in chapter 3 of the study).

The (2-digit) industrial categories identified are listed below. Certain miscellaneous industries were also chosen mainly because of their uniqueness in Prairie locations.

Standard Industrial Classification (SIC)

Manitoba

(SIC 30) Rubber and plastics products.
(SIC 34) Fabricated metal products.
(SIC 35) Machinery except electrical.
(SIC 36) Electrical and electronic machinery, equipment and supplies
(SIC 37) Transportation equipment.

Saskatchewan

(SIC 24) Lumber and wood products except furniture
(SIC 34) Fabricated metal products.
(SIC 35) Machinery except electrical.
(SIC 37) Transportation equipment.

Alberta

(SIC 30) Rubber and plastics products.
(SIC 34) Fabricated metal products.
(SIC 35) Machinery except electrical.
(SIC 36) Electrical and electronic machinery, equipment and supplies.
(SIC 37) Transportation equipment.

(ii) The second step of the sample design involved selecting the urban centres to be surveyed to meet the third objective set out initially. In selecting the centres one basic criterion had to be fulfilled. The centres had to contain the type of industries required to fulfill the objectives of this study, that is, the centres had to have at least two or three of the industries listed above, so as to have a sufficient population from which to draw the samples from.

In a relatively recent factor analysis on prairie centres, Welling (1977) was able to classify 264 Prairie centres into seven categories on the premise that each category has some similarities in terms of growth, size, economy, status, and ethnic characteristics. For this reason Welling's section on the economy is especially relevant for this study. This economic dimension relates to the amount of secondary industries and the percentage of people employed in processing occupations in each centre. On the basis of his multivariate analysis of prairie towns and a current review of statistics on the number of establishments for the chosen industries, two levels of centres were selected:

Level 1	Level 2
Metropolitan	Regional
Winnipeg	Lethbridge
Edmonton	Brandon
Calgary	Red Deer
Regina	Moose Jaw
Saskatoon	Prince Albert

Centres such as Medicine Hat, Selkirk, Steinbach, Winkler, Morden, Altona, and Yorkton were considered but they were eliminated because they are largely processing centres or dominated by only one industry. Manufacturing within the growth industries is not adequately represented or too few firms exist for sampling purposes. Although there are functional differences in the economic base of centres within both the metropolitan and regional categories if the scale is enlarged, this study is not concerned with such within-category differences. The size difference of centres between the categories and the functional differences attributed to such urban centres by central place theory, is sufficient for the purposes of this study.

(iii) The third step of the sample selection involved choosing the firms from the Patent list and from the general trade directories of the selected centres. One possible important control variable - employment - which was originally intended to be used as a means of systematically choosing the firms, had to to be omitted. The main reason for its omission was that there were insufficient establishments in each industrial sector to sample different sized firms from each sector and still allow for alternative firms in the case of rejections from the first sample selected. Duplications of firms were eliminated from the patent list and the trade directory list. A random based systematic sample was then used to select firms for the interviews. A coin was spun to determine whether the first or the second firm was to be chosen. The firms were ordered alphabetically as they would appear normally in any trade directory. Alternate firms were subsequently chosen.

The distribution by industry and location of the total number of firms in the patent and the trade directory lists is shown in Table 11. An equal number of sample firms was initially drawn from the two lists. But, as shown in the table, the number of firms that were successfully interviewed from the two lists is not equal. This was due to rejections and industrial mis-classification of firms in the trade directories from which the non-innovator list was drawn. Fortunately, very few firms, between one percent and fifteen percent, declined to be interviewed. The innovator sample was drawn first. The chosen firms were then eliminated from the firms listed in the trade directory list to avoid duplications. The 'non-innovator' firms were then selected from the remaining firms in the trade directory lists. It was noted earlier that a major weakness of the behavioural approach is the small size of the sample to satisfy the objectives of such studies and inability to ask a large number of questions because of resource limitations. The present approach is an attempt to compensate for some of the deficiencies. It is more comprehensive than most of the firm behavioural studies in geography as noted in Chapter Two, because it has a large sample and the physical scale of the area under investigation is also large.

A. Questionnaire Design

In order to obtain an efficient and unambiguous questionnaire, it was necessary to develop and pre-test questions. Eleven firms were interviewed in Edmonton. The firms were selected on a systematic random basis. Key personnel in chosen firms were selected and contacted for interviews. The interviews were conducted personally by the author. Initially only about ten broad questions were asked. The questions were open-ended and focused on the historical development of the firms. The interviews proceeded by the interviewer asking the respondent to outline the initial location reasons, to indicate how he/she personally was involved in the decision-making process, to describe the key investment decisions process, and the type of problems encountered. The key interviewees in all eleven cases invited other respondents from their firms to participate in the interviews. This ensured that their descriptions were corroborated. Also, the participation of more than one respondent facilitated the division of the interview questions into different sections. After each pre-test session, questions which required long response time or which required the respondents to delve into their record books, were isolated. These questions were included in the call-back questionnaire.

Open and Closed Questions

Many researchers have contributed to the controversy over the issue of closed and open modes of questionnaire design as well as the mail-back questionnaire. (Schuman & Presser, 1977; 1979; Dillman, 1972; Andreasen, 1970). There are two main reasons for employing open questions. One centres on spontaneity and the other on the need to avoid bias. Closed questions are often preferred because they are efficient and facilitate coding and analysis. Mail-back questionnaires tend to alienate respondents. They are often seen as an invasion of privacy. However, various efforts are made to lessen this alienation. These efforts include initial contacts by telephone to prepare the potential respondents of future mail-back questionnaires, personalized letters to the respondents, cash or prize incentives, timing of contacts, and stamped reply envelopes.

In designing the questionnaires, all these variables were considered. Because the issues under investigation were varied, it was necessary to combine both open and closed questions in both questionnaire schedules used. Some of the questions were closed as a result of the responses from pretesting. These questions were closed because there was little variation in the responses obtained from the pilot tests. The adjectives used to describe government programmes were derived from a larger set of possible adjectives presented to the initial firms used for pretesting. The adjectives selected most often by the interviewees were isolated. It was noted that the pilot interviewees were quicker in their responses on the adjectives presented on a bipolar scale than the adjectives that were used in open-ended questions. The approach using a structured interview, allowed a rapport to be established with the respondent so as to be able to delve deeper into areas where more subjective open-ended questions were appropriate. Most of the mail-back questionnaires were actually collected a few days after the main interviews. The response rate on the questionnaire also proved to be excellent as a consequence of the initial contact.

B. Questionnaire Structure - Appendices B and C

The Interview Schedule

The questions for the interview questionnaire schedule were grouped into six parts. Part one was designed to trace the motives underlying the development of the firm. The questions in Part two were designed to find out the type of expansion path a firm selected in order to fulfill its goals. The series of questions in Part three aimed to establish the importance of innovation, one of the growth strategies. The interviewees were requested to assess the impact of government programmes.

Information on the organizational structure of the firm was sought in part four. Specifically, the questions were designed to help isolate the potential influence of internal organization on the innovative performance of the firms.

Part five dealt with constraints and stresses encountered during the development process.

Factors influencing the location and spatial organization of the firms were stressed in part six. Sub-sections three and four in particular, were designed to illustrate the role of the relocating plant in technological change and regional development. Little is known about the technological impact of this type of industrial establishment upon the regional economies of peripheral areas.

The Call-Back Questionnaire Schedule

Due to the nature of the survey, in terms of the kind and amount of information desired and the number and seniority of executives required by the sample, it was necessary to use a call-back questionnaire as well. A list indicating the type of executives interviewed is given in

Appendix D.

A structured questionnaire was designed to provide comparable response data which would not have been easily accessible during the short time required for the personal interviews. The interviews lasted from between one and half hours and three hours. Repeat trips were warranted in most of the cases. Arrangements were also made to collect the questionnaires a few days after the interview. The questionnaire consisted of three parts:

Part one was aimed at obtaining information on the name and location of the participating firm, ownership organization, size of firm (in terms of employees), value of shipments, and product characteristics.

Part two dealt with basic data on R&D input, in terms of employment percentage contribution, and product/process generation.

Part three dealt with the frequency of use of government programmes, especially those that encourage R&D.

These characteristics were sought because they provided: (i) a better understanding of the legal structure of a firm, (ii) a better method for classifying the firms into the various age phases, (iii) an added medium for isolating the factors associated with the 'filtering-down' of industry concept, and (iv) an effective indicator of the use of government services.

C. Response to the Survey

Telephone contacts were initially made with the selected firms to ensure their participation and to arrange for a mutually agreeable time for the interviews. Repeat trips were warranted in most of the cases. Arrangements were also made to collect the call-back questionnaires a few days after the interview. This procedure quaranteed a high rate of return. All the questionnaires were completed.

The details of the response to the survey are presented in Tables 11 and 12. The relevant population of firms in the patent and trade directory records consisted of 450 firms: 361 firms in the metropolitan centres and 89 firms in the regional centres. The proportions of firms drawn from the trade directory records and successfully interviewed range from between 34% to 47% in the metropolitan centres and from 45% to 50% in the regional centres. A higher proportion of firms was sampled from the regional centres as a whole; about 50% of the total number of relevant firms in the regional group was interviewed. On the basis of individual centres, the proportion of sampled firms varies (Table 11). The higher proportion of firms sampled from the regional centres is due mainly to the low level of rejections. The proportion of sampled firms located in regional centres varied from 37% to 60%. The smallest proportion of sampled firms was in Edmonton. This is because the pre-test interviews of eleven firms were conducted in Edmonton. The responses from the pre-test interviews were not included because the interview questions were changed between interviews with experience gained from responses.

The distribution of the sample proportions in the selected manufacturing industries which vary from 30% to over 70% is shown in Table 12. Samples were drawn from eleven industrial sectors. Only two industrial sectors, fabricated metal and machinery, contained sampled firms in all the centres. High sample proportions were also drawn from those sectors. Samples were drawn from all but one industry (lumber and wood products) in the metropolitan group. For the regional centres as a group, no sample was drawn from the rubber/plastics, stone/concrete, primary metal, and measuring instruments industries. The responses to the questions contained in the questionnaire schedules are considered in the following chapter.

D. Statistical Methods

The method used to examine the characteristics associated with different firm age phases is based on the correlation of the date of establishment and the number of years that the products have been on the Canadian market (independent variables) with the other variables and dimensions, e.g., scale and growth strategies (dependent variables), under investigation. Along with the frequency counts and the percentages, the multiple response analysis, the chi-square (for nominally measured variables), the Kolmogorov-Smirnov tests, and the Spearman rank correlation are the main tools used in analysing the relationships between the factors for the various categories of firms. The Krushal-Wallis analysis of variance is used to test for a difference between the firms in the various development phases over the different types of investment and location decisions, taking each attribute in turn. The regression analysis is used to measure the linear relationship between scale variables and age. Detailed explanations on the statistical techniques are provided in Appendix A. The main traditional classifications of the levels of measurement of variables are nominal, ordinal, interval, and ratio. The nominal level, which is common to the input of this study, is the lowest classification. It makes no assumption about the values that are assigned to the data. The values are categorical. There is no assumption on the ordering or distances between categories because there is no *a priori* grounds on which one set of variables is superior to another. Too often in the social sciences efforts are made to 'glorify' behavioural data with higher levels of measurement. The triviality of the fields of study are invariably masked by statistical jargon.

The ordinal level measurement is, also, common to this study. With ordinal measurement it is possible to rank all the categories of a variable according to some criterion. Each category, for example, the degree of importance of innovation to a company, has a unique position relative to the other categories. But, the distances between the categories are not known. The interval and the ratio levels of measurements are ordinal variables with known category intervals. For the nominally scaled variables, the relationship between the age of the firms/products and each of the variables studied is depicted in a crosstabulation table and summarized with various measures of association and significance tests. Since the tables are large, they cannot all be reproduced. But, some examples are included and will be discussed. A measure of association indicates how strongly the variables considered are related to each other in the cases actually examined.

Since only a proportion of the total population of the relevant manufacturing sectors was considered and because a major facet of this study concerns the possibility of making inferences that the relationships found in the sample exist in the total population, tests of statistical significance were carried out. A significance test indicates that the relationship observed in the sample could have happened by chance. The conventional five percent level of significance, as accepted in the social sciences, has been chosen for this study. Those relationships which have a probability of occurring by chance five percent of the time or less, that is, in 5 out of 100 samples are accepted. If a significance test shows a probability higher than 5%, it is concluded that there exists no relationship at all, and if this probability is 5%, or lower, the conclusion is that there exists a relationship.

There are some rules governing the choice of measure of association and its significance test. When two variables are measured at the nominal level, chi-square, Cramer's V, the contingency coefficient, Lambda and the uncertainty coefficient are the appropriate statistics. When the two variables are measured at the ordinal level, Kendall's tau B, and C, gamma, or sommers' D are the required tests. With the exception of Cramer's V and the contingency coefficient all the others are associated with the probability of predicting the value of one variable if the value of the other variable associated with it is known.

Explanations of the computer programmes (mainly MIDAS and SPSS) used, along with the modifications made to them, and the statistical techniques are detailed in Appendix E. The modifications used did not change the way in which these programmes were used or the results obtained.

V. DATA ANALYSIS

A. Firm and Product Classifications

Firm Classification

In order to identify and classify the different development phases, an arbitrary rule had to be established. Since it has been accepted that the period of rapid manufacturing growth on the Prairies occurred after the Second World War, all the firms established before 1940 have been classified as old. All the products in existence before the Second World War have been classified as old. Mature products are classified as those marketed between 1940 and 1960. Young products are those that have been on the market for less than seventeen years. Patented products are legally protected for that length of time and it is considered, therefore, that this could constitute the youthful phase of a product development. Such a classification based on the sample firms and their products, is needed to operationalize the study, thus allowing it to proceed further with an analysis of firm behaviour in each development phase.

The dates of the establishment of the sample firms have been classified into eight time periods as shown in Table 13. Out of the one hundred and ninety seven firms surveyed, only three establishment dates could not be ascertained. The majority (35%) of the companies were established during the 1961-70 period. Only 18% of the companies were in existence before the Second World War. On an individual basis, Winnipeg has the highest proportion of older firms. Over 10% of the companies were already in existence before 1939. It also has the smallest number of companies that were established during the 1961-70 period. Regina and Calgary have the highest proportion of these firms. Moose Jaw and Lethbridge have the lowest number of firms in this period. Although the regional cities on the whole have a higher proportion of the youngest firms (that is, those established after 1971, they also contain a higher proportion of firms established between 1941 and 1960. The major metropolitan centres contain a higher proportion of the very old (1900 to 1940) and mature firms (1961 to 1970). For the Prairies as a whole, the distribution of firms with respect to age (based on the date of firm establishment), indicates that the majority are either youthful or mature firms.

The pattern of establishment dates reflects the growth of manufacturing on the Prairies. Before 1939, manufacturing dominance was enjoyed by Winnipeg, but this dominance was greatly reduced during the mid-1950s. According to Statistics Canada (1975), between 1956 and 1975, total employment in manufacturing increased by 19%, 28%, and 42% for Manitoba, Saskatchewan, and Alberta respectively. In addition, it has already been shown in the analysis of the growth patterns of selected manufacturing industries (chapter 3) that the sharpest rise in the values all the variables examined occurred between 1961 and 1970. However, marked fluctuations were evident between 1960 and 1975.

Product Classification

In the above discussion on the age structure of the firms, it was mentioned that this structure consists mainly of young and mature firms. The question on the ages of the products generated a multiple response because Prairie firms are producing at different stages of the product cycle. It was necessary, therefore, to combine all the responses for each time interval in order to obtain an accurate assessment of the age pattern of the products. For this purpose, a multiple response analysis was performed. The results are presented in Table 14. Of the 194 firms, 52% indicated that their products came on the market during the immediate post-Second World War period, that is, between twenty one to thirty years ago. For the Prairies as a whole, very few firms are producing items which came on the market during the past ten years. A few researchers such as Pred(1966) and Thompson(1968) have shown that new products (undefined) tend to be introduced into such peripheral areas as the Prairies at the mature stage of the development of the product. In addition, even the adoption of new technology tends to proceed more slowly in Canada than in other developed countries (Globerman, 1974; Cordell, 1976). Therefore, the finding of this study lends some support to the hypothesis of a lag in the introduction of new products, and the fact that prairie firms have begun manufacturing products at the later stages of the product cycle. Overall, the conclusion of past work implies a relatively low level of innovativeness in peripheral areas for new products not including the upgrading of existing products.

The Firm and the Product Life Cycle Classifications

The development of a firm is interwoven with the product development. Firms are created at different stages of the product cycle, thus revealing that several categories of firms can emerge as a result of the relationship between the age of a product and the age of a firm. The major categories of firms are:

1. old product/old firm
2. mature product/old firm
3. young product/old firm
4. old product/mature firm
5. mature product/mature firm
6. young product/mature firm
7. old product/young firm
8. mature product/young firm
9. young product/young firm

Therefore, to determine the existence of these categories for the Prairie firm, a multiple response crosstabulation was performed on the variables (Table 15). All the categories listed above exist on the Prairies, but the most common groups are:

1. mature products/young firms
2. mature products/mature firms
3. mature products/old firms
4. old products/young firms

The metropolitan centres have a similar product/firm age structure, but Regina and Saskatoon deviate slightly. The two centres have a higher proportion of young firms with old products, and the regional cities have a higher number of firms at all the age levels producing old products. The major metropolitan centres (Winnipeg, Edmonton, and Calgary) contain a higher proportion of mature firms with mature products as well as young firms with young products.

In order to make the analysis manageable it was necessary to combine the product age groups as well as the firm age groups. The firm age groups were limited to two: mature and young (Table 16), since the number of firms The product age groups were reclassified into two basic groups (Table 17). In view of the fact that very few of the firms are producing very young products, the products groups have been reclassified into mature and old, thereby conforming to the most common groups. The number of firms in the 'old' category is too small. This regrouping allows for any significant association to be ascertained. Although the multiple response analysis, which was used initially, was useful in aggregating the responses, it made no allowance for significant relationships. A chi square test was used to examine the relationship between the age of the products and the age of the firms. The results indicate that a significant relationship (99% level) could be found between the age of the firms and their products(Table 18). Young firms were particularly associated with mature products.

Certain significant differences were found between the metropolitan centres and the regional centres. The metropolitan centres contained more young firms with mature products and mature firms with mature products. The regional centres, on the other hand, contained more young firms with old products and mature firms with old products. On the whole, the regional cities were significantly associated with young firms manufacturing old products.

B. Initial Location Factors

As mentioned above the birth of a firm is usually preceded by at least three decisions (Smith, 1971). As he stated these decisions relate to

1. the scale of the operation,
2. the production technique to be adopted, and
3. the location of the firm.

These decisions are not necessarily operationalized before the legal establishment date, but once the entrepreneur (owner or manager) has either made the decisions or at least become aware of the need for them and establishes the date of incorporation, the development of the firm begins as a manufacturing entity. The three decisions concerning the scale, technique, and location of the firm that may be made during the initial establishment period are reflected eventually in the growth process of the firm.

For the purpose of this study, the birth of a manufacturing firm is defined in terms of the date when the legal incorporation of the initial firm occurred. The initial firm refers to the founding organization, which must not have existed as a manufacturing concern before. Although every attempt has been made to interview the executives most knowledgeable about the history of the surveyed firms, there are some cases where only a sketchy history could be obtained.

The many diverse reasons for the establishment of a firm identified by the surveyed firms are listed in Table 19. The major reason indicated is personal or due to chance. Over 60% of the original founders either lived where the companies were established or lived in close proximity to the original locations. The personal factor not only includes the residency of the respondents, but also it includes the respondents' familiarity with the business and the desire for the family business to have a continued life. As the motivating factor sixteen percent of the respondents cited the favourable economy and the expanding provincial market. This factor also relates to the favourable tax benefits and ease of operation. In those instances where the historical background of the company was unclear, the respondents referred to the factor of acquisition (about 5% of the cases) as the deciding factor in the initial location. The respondents in this instance were not making the initial location decision other than the decision to acquire that specific firm. These acquisitions were often motivated by the need for additional funds. The assets of the purchased companies were sold off immediately after purchase.

The executives were also asked to rank the various factors on a scale of one to five, from not important to highly important (Table 20). The ranking of the factors is closely linked to the final deciding factor discussed above. Seventy percent 70% of all the respondents considered the variable relating to personal reasons to be highly important. Favourable economy and expanding provincial market, were also considered to be moderately or highly important by 70 to 80% of respondents. The personal factor was ranked highly in the five metropolitan centres. In general, factors considered to be of little importance are proximity of the surveyed firm to its parent company, the presence of other firms in associated or related fields, the availability of professional services, and government incentives.

Since the overwhelming response to the initial location factors revolves around the resident location of the founders, it is not surprising that the majority of the head offices of the firms (82%) were at the interviewed locations. Any changes which may have occurred since initial establishment will be considered in association with the growth strategies adopted and location decisions.

Development Phases and Initial Location Factors

To determine whether the firm development phases differed on their initial location factors, a Kruskal-Wallis analysis of variance was employed. Mature firms with mature products in Winnipeg, Prince Albert, Regina and Calgary ranked the personal factor higher that the rest of the firms in the same development phase in the other centres. Mature firms with old products in Brandon and Prince Albert rated the availability of resources considerably higher than firms in the same development phase in the other centres. The availability of government incentives also proved to influence the old firms with old products in Prince Albert. Winnipeg and Brandon ranked the personal factor higher. Firms in the same development phase also gave higher rankings on the availability of professional services (in Brandon and Prince Albert), and the availability of government incentives in Prince Albert and Regina.

Experience of Respondents in Manufacturing

There are numerous studies on the origin of new firms, such as those dealing with the 'seed-bed' growth of new firms. The birth of a firm can be prompted by a desire to bring an invention (a patented idea) into commercial production, or to try a different production process, or simply to be self-employed. The last mentioned is a major feature of the 'seed-bed' growth hypothesis of new firms. The survey response indicated that about four percent of the new firms resulted from the desire to bring an invention into commercial production. This low percentage is rather deceptive in that more companies were actually the result of inventions but the respondents preferred to cite other factors, such as the personal aspect. However, in response to the question on the radical nature of the innovation, over 60% of the respondents asserted that the initial innovation was radical because it was one of the major stimuli that led to the establishment of the firms. But, the firms that did not consider their innovations to be radical were significantly (0.01% level) associated with mature firms (old products). The Winnipeg mature firms (old products) were particularly associated with this phenomenon.

The desire for self-employment is dominant. Respondents were motivated to be self-employed particularly because of dissatisfaction in their previous employment. This finding provides further support for a previous observation on Canadian entrepreneurship by Litvak(1971). Eighty percent of the respondents indicated that they had some experience in the same field before their involvement with the existing operations. These respondents had had a formal or informal apprenticeship. Also, 20% of the respondents had worked for other companies in the same field. These respondents gained their experience from associated professions such as the civil service.

Development phase and experience in manufacturing

In terms of a significant association with an age group, the respondents of the young firms with mature products, in especially the five metropolitan centres, had previous experience in their existing fields. This relationship was significant at the 99% level of significance (12 chi square,3 degrees of freedom). Although no statistically significant association could be established for the regional centres, the majority of respondents of the firms in the mature firm/mature product development phase indicated that they had some experience in manufacturing.

Ownership Structure

With regard to the type of ownership it is predominantly private (Table 21). Over 70% of the firms were privately incorporated, 11% were incorporated as a partnership, and 16% were incorporated as public companies.

Although the structure of the ownership is mainly independent, 56 interviewed firms indicated the existence of parents (Table 22). The headquarter locations of 14 of the firms were in the United States. Thirteen firms indicated an Alberta location and Quebec was the third most common location of parent companies. The groups of centres showed the same patterns of type and structure of ownership as the Prairies did overall.

Among the reasons offered for incorporation were: tax benefits, the need for additional funds and limited liability. These were offered in conjunction with their initial reasons for establishment. None of the reasons mentioned for incorporation was significantly associated with any of the development phases.

Development phase and ownership structure

The majority of the young firms with mature products were privately incorporated. The development phase consisting of mature firm/old product was typified by publicly incorporated firms. This phase also had a higher proportion of partnerships than the other development phases.

Initial Industry

As Table 23 indicates, the manufacturing sectors initially chosen by the entrepreneurs interviewed vary. The changes which may have occurred since the initial production will be discussed in conjunction with growth strategies. In this study, the size of the industry sub-sample also varies between industries. This variation has been influenced by two factors:

1. the size of each industry in each region and,
2. the innovativeness of the industry as determined by the incidence of patenting.

Firms which belong to the metal fabricating, machinery and plastics industries are dominant. The major 4-digit industrial sectors initially chosen by the respondents were agricultural implement, oil and gas production equipment and miscellaneous plastic fabrication. The regional centres have a high concentration of firms which belong to the wood products and primary metal industries. Regina and Saskatoon as a group has the highest proportion of firms that belong to the machinery industry. Both the major metropolitan centres and the regional centres have a broader range of industries than the Regina and Saskatoon group.

Development phase and initial industry

An attempt was made to determine if the industries were significantly associated with any of the development phases Only one industrial category - plastics fabrication - was statistically associated ([illegible] chi square, with 3 degrees of freedom, at 5% level of significance) with a development phase (young firm/mature product). Although no statistically significant relationships exist, firms in the same development phase are prevalent in the agricultural implement and oil and gas fabricating industries. Firms that belong to the mature firm/old product development phase are also prevalent in truck transport manufacturing.

C. Strategies for Growth

The preceding discussion has focused mainly on the basic features of the firms with specific references to the decisions that are made on initial location. Other aspects of the decisions on production techniques, scale, and consequent locations are emphasized in this section.

Once a certain technique or strategy has been chosen, the evolutionary process of a firm has been strongly influenced. This evolutionary process is a complex interaction of demand and supply factors. In other words, the key areas of a firm's evolutionary process should include innovation, management and adjustments to external conditions. To understand the development process of a firm, it should be possible to isolate the firm's methods of developing and maintaining itself as an organization. Included with the methods are: the means with which the firm secures financial resources, acquires technology, develops markets, creates an adminstrative organization and obtains labour. However, the main concern of this study is with the internal growth process of a firm, demand being considered as an exogenous factor. While attention will be concentrated on the internal resources of the firm, it is necessary to realize that the demand factor cannot be ignored completely. In addition, the pattern of evolution of a firm is not only influenced by the demand factor but also by the phase of the product cycle in which the firm initially starts production.

Objectives of a firm

Prior to the choice of strategies, entrepreneurs are prompted by specific goals or motives. One of the findings of the literature is that entrepreneurs have multi-dimensional motives. Table 24 gives a summary of the rankings attained by each motive for all the firms that were surveyed. Very few of the companies lacked a set of objectives, although the majority admitted that they had unclear company objectives initially until outside capital was sought. About 80% of the cases ranked the provision of a good product/service and the maximization of profit as being highly important. However, the profit maximization motive was qualified in the sense that it was seen as the result of the provision of a good product/service. The pre-occupation with growth and development as motives was considered to be highly important in about 35% of the cases. But, the majority of the companies ranked these two motives on the moderate scale. The moderate importance attached to these motives could perhaps explain the small size of the majority of the firms interviewed. In fact, the respondents offered two types of explanation to qualify their ranking of these motives. One explanation centred on the factors that preclude growth, and the other was based on their unwillingness to expand even with available resources. The first type of explanation, which will be discussed later under the problems that firms encounter during their development, involves mainly capital shortage and to a lesser extent, the ownership structure of the firm. The second type of explanation involves the respondents' conviction that small size leads to efficiency, complete control by the owner, favourable relations with employees and the best environment for specialization.

The desire to stay ahead of competition and to survive in the industry were also ranked highly in over 66% of the cases. Although only 36 cases mentioned the existence of other motives, such as personal and community satisfaction, 16 firms considered such motives to be highly important. The generation of research and development activities, and the payment of dividends to shareholders attained only moderate rankings. The goal of 'running the company' was considered to be the least important. There is very little deviation in the rankings when the groups of centres are considered.

In order to determine whether the distribution of the rankings on the motives was due to chance variations, a K-S test was employed. Nine of the ten motives were significant, that is, there were significant differences in the number of responses on each rank for each motive. Only the personal/community satisfaction motive was not significant. This situation also applied to the various levels of centres, with the exception of the major metropolitan group, which showed a difference on the number of responses to the R & D motive.

Development Phase and Goals

Since it is quite conceivable that there are differences in the mean ranks of the different development phases (based on the age of the firms and the age of the products), a Kruskal-Wallis one-way analysis of variance was employed in or order to examine possible differences. Certain differences did emerge. The desire to stay ahead of competition received high rankings from young firms with mature products in Winnipeg, Brandon, Saskatoon and Calgary. The profit maximization motive was strongly emphasized by young firms with old products in Winnipeg, Brandon, Red Deer, Edmonton and Calgary. This motive was also highly stressed by mature firms with mature products in Moose Jaw, Saskatoon, Edmonton and Calgary. Mature firms with old products in Winnipeg ranked the desire to develop the firm higher than the other firms in the same age group in the other centres.

Strategies

The appropriate strategies which have been chosen by the surveyed firms to attain the various goals discussed above are listed in Table 25. The responses show that most firms adopt more than one strategy for growth. In this study, it was found that up to six different strategies were adopted by a single firm. No particular preference of adoption exists among the strategies, except for that of distributorship. Initially, an attempt was made to obtain a chronology of the adoption of each strategy but the respondents were often vague in their responses.

However, the table shows the numerical order of the strategies as coded for the analysis. For example, column one shows that 57 firms of the total of 197 started out by distributing other manufacturers's products and are still distributing. It should be noted that 90% or more of their operations are now involved with manufacturing. This column also indicates that all the surveyed firms have at least one strategy for growth. Column two indicates that 194 firms have two strategies, one of which is listed in that column and the other could be any of the others (#0,1,2,7) listed in column one. Column two also shows that only three firms have adopted one strategy for growth, that is, the difference between column one and column two. All the possible combinations of the growth strategies are presented in Table 26. For example, under the six-strategy combination, the first combination (012345) ranges from distributorship to merger and one firm has adopted this combination. The most common combination of strategies is (2,3,4) which encompasses the diversification measures. Nine firms adopted this combination. Among the six-strategy group of firms, diversification and merger, branch plants, and modernization or the creation of divisions, were adopted by eight firms. The adoption of six strategies was more popular with the five metropolitan centres than the regional centres. Regional firms with four strategies were more numerous.

Since the question on strategy generated more than one response, a multiple response analysis was employed to indicate the total number of responses for each strategy. The results of the analysis are presented in Table 27. Apart from the frequency count for each strategy, the table also indicates the frequencies as a percent of the total number of responses and the frequencies as a percent of the total number of valid firms.

Product/market diversification

As shown in Table 27, the most common strategies are the various forms of diversification which have been classified as vertical integration (related product lines), conventional or conglomerate, and geographic. Vertical integration refers to the ownership and production of inputs to a company's principal product or service. Among the surveyed firms, it is possible that goods are transferred between their divisions, but it was found that new companies were established by the same owners to produce the vertically integrated products. In most cases the owners were reluctant to divulge information about these companies.

The conventional output diversification or conglomerate diversification refers to the production of goods and/or services which are not related to the existing lines of the company. Geographic diversification refers to the production of the existing product lines, but in markets which are different from the original or main market base of the company.

The diversification strategies are related in important ways to the rest of the strategies. The diversification measures in this study relate mainly to internal expansion. It was realized that the measures may have been associated with the acquisition of, or merger with other companies or even through the creation of branch plants. The respondents were asked to state if the diversification measures (internal expansion) were undertaken in a different period or at different times from the establishment of a branch and/or merger; then the two or three strategies were recorded. Otherwise the internal expansion achieved through merger was recorded as one of the diversification strategies and the internal expansion achieved through the establishment of a branch plant was recorded as branch plant.[10]

The responses obtained from the groups of centres are given in Table 27. Diversifications are dominant but they are more pronounced in the regional centres. A clearer picture emerges with the groups of centres. Here, the metropolitan centres show a balance in the strategies, although the major responses still relate to the internal diversification measures.

Product diversification

Economic theory provides many reasons as to why firms diversify but it does not fully explain the extent and the character of the diversification measures actually chosen by the firms. Therefore, in order to determine the character of the diversification measures achieved through internal diversification, the respondents were initially asked about their original products (principal products in most of the cases), and then queried about their subsequent products. Details of the original products (in manufacturing) have already been provided (Table 23). Further details provided in Table 28 indicate the frequency distributions of the subsequent or secondary industries, where the firms have diversified. These industries are regarded as secondary only in the sense that they were not the original industries with which the firms started. In some cases the secondary industries have become principal generators of revenues. Only the current (at the time of the interview) first and and second industries will be considered in this study. A number of the firms belong to more than three industries. Also, diversification involving the establishment of branch plants (those established at a different time from the internal expansion at the same location) will be considered later in this section. On the whole, about 80% of the surveyed firms have diversified internally into over 60 sectors in the manufacturing industry.

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[10] For example, in Table 26 under four strategies, two companies have a 0,2,4,9 combination. This combination means that the two companies started off by distributing other manufacturers' products, then diversified into related product lines , as well as diversified into different markets and also established branch plants. These strategies were instituted at different times. Other than the distributorship, no order of adoption is implied.

An attempt was made to detect chronological changes in the types of industry, and in the total number of industries to which each firm belonged. The details are given in Tables 29 and 30. Complete data on the industry changes were available from 1970 to 1978 (at two-year intervals). Most of the firms belonged to one industry, although the proportion of the firms in this category fluctuated during the period. The proportion of firms that belonged to two industries fluctuated markedly.

In terms of the changes in the firms' principal industries (prime revenue generators), most of the firms remained in the same industry throughout the period examined. Thirty percent of the total firms with the same principal industrial sector, were in the machinery industry. Regina and Lethbridge (both centres for the agricultural implement industry) had the highest number of firms in this category. The rest of the regional centres also had a high number of firms that remained in the same principal industrial sector throughout the period examined. Calgary and Winnipeg had a more balanced distribution of firms with the same principal activity in the industrial sectors. The machinery industry again contained the largest number of firms that changed their principal industrial sectors, but remained within the machinery industry. The metropolitan centres of Regina and Saskatoon had a higher proportion of firms within this category than the three other metropolitan centres. There were very few intra-industry changes in the principal activities of the regional firm, with the exception of Moose Jaw (Table 30b).

In terms of inter-industry changes, whereby the firms changed their principal activity from one industry to another (2-digit SIC), the major occurrences were between the metal fabricating and the machinery industries. The

Alberta centres, especially Edmonton, had the highest number of changes from metal fabricating to machinery (from SIC 43 to SIC 35 - Table 30 section c). Principal activity changes involving machinery to metal fabricating occurred mainly in Regina and Saskatoon. The Alberta centres also had the highest number of firms that changed from transportation equipment to machinery.

Geographic diversification

With regard to geographical diversification, a summary of the current market areas of the firms is presented in Table 31. These market areas are for the existing product lines of the firms. They include both related and unrelated product lines. The extent of the original market areas was not formally measured, but as the responses indicate, the majority of the firms have a local/regional market orientation. This orientation is pronounced for the firms located in the regional centres. The market orientation of the metropolitan firms is more balanced, that is, almost an equal number of responses were obtained on the regional, national, and international markets. Further details of the regional and local market orientation are provided in Table 32. The hierarchical ranking of the trading areas is provided. The majority of the firms indicated a greater orientation toward the regional market than toward the provincial market(Table 33).

Although the respondents were not questioned on the specific stages of their geographic diversification since they were established, they were asked about their revenue market producing search activity. The responses to the search activity are presented in Table 34. The respondents cited an involvement in two different markets - exports (32%) and other markets (9%) in Canada. During the 10-year period for which reliable data were available, the proportion of firms involved in the export markets increased significantly. Almost 50% of the firms indicated an involvement in the export markets by the end of the 10-year period.

To obtain an overall view of the extent of the diversification measures, the respondents were asked to state the number of product lines and the nature of the changes which may have occurred since the establishment of the firms. In terms of the actual number of lines manufactured, at the end of the period examined, the tendency is toward the extremes (Table 35). On the one hand, 40% of the firms have less than four product lines, and on the other hand, over 35% of all the firms have more eight product lines.

In terms of the nature of changes to the product lines, the majority of the firms have been involved with the addition of more lines (Tables 36 and 37). About 70% of the firms have added between one and nine product lines since their establishment. During the 10-year period (1968-78) for which continuous data were available, most of the firms were multi-product.

Other Strategies

Turning now to the other strategies shown in Table 29, the survey results show that distributorship, creation of divisions, and branch plants are also popular choices. In the light of the recent growth of manufacturing on the Prairies, it is not surprising that almost 30% of the responding firms entered manufacturing through the distribution of other manufacturers' products. Also, it was indicated earlier that most of the respondents had previous experience in their line of business. The distributorship aspect is dominant in all the centres, with the exception of Prince Albert. This exception could be due to the fact that most of the surveyed companies in Prince Albert are largely resource-oriented and are either big companies or very small companies. The latter are primarily owned by local entrepreneurs who have worked previously for the larger companies in the centre.

The creation of divisions involves the delineation of functions within the firm (including its associated establishments). The delineation is accomplished through a restructuring of the firm into various departments, such as marketing, manufacturing or production, accounting and drafting. Accompanying the departmental structure is a hierarchy of decision-making personnel, from the production manager level to the president or chairman of the board level. This reorganization is designed to make the decision-making process more efficient by separating related activities into groups. The groups can then make decisions which are relevant to their proper functioning.

Although the surveyed firms were not specifically questioned on their organizational design, they were queried on the spatial orientation of their functional delineation. Therefore, the following discussion on company structure is designed to give some insights into the extent of their spatial decentralization of functions.

Company structure

Due to the multiple response nature of the attributes of company structure, it was necessary to perform a multiple response analysis. As indicated in Table 38 for most responses, between 80% and 90% of all the respondents claimed to perform all but six of the functions at the locations where the interviews were conducted, that is, at the main (or only) location of the surveyed firms. Between 10% and 25% of the functions involving the appraisal of investments, obtaining loans and the approval of final budgets were reported to be carried out by the parents. Legal and transportation services were mostly purchased from independent companies.

The metropolitan and the regional centres were similar in most of their responses to company structure. They differed on pricing, budget appraisal, management structure, legal services and in accounting services. The regional centres were more reliant on parents and independent companies for pricing policies, management, legal services, and accounting services. The firms in the metropolitan centres relied more on parents for their budget appraisals than the firms in the regional centres.

The actual combination of functions were performed jointly or individually by the companies and other establishments. The major functions indicated involved mostly sales, general maintenance, and the transportation of materials and finished products. In addition, the surveyed firms mentioned that eight functions (including legal services, loans, and budget) were performed by their parents only. The major area where the subsidiaries of the interviewed firms seemed to have a great deal of autonomy, was in the sales coverage of the market territory.

In addition to the creation of divisions, the establishment of branches and the institution of joint ventures were major forms of firm strategy for growth. As indicated in the preceding analysis of company structure, not all the functions were performed at one location. A summary of the characteristics of the subsidiary operations is presented in Table 39. Eighty-seven of the surveyed firms claimed the ownership of one form of subsidiary operations. All but one of the respondents claimed to have more than 50% ownership in the subsidiary operations. Over 50% of the responding firms reported an involvement in at least one subsidiary (branch or associated company). With 33%, Alberta firms had the highest proportion of branch operations, followed by Saskatchewan with 13%. About 13% of the responding firms also had subsidiary operations in the U.S.A. One firm reported the location of its plants to be worldwide. During the period (1968-78), there were few changes in the location of the subsidiaries. The number of firms associated with the ownership of one branch increased from 35 in 1968 to 51 in 1978.

The types of functions performed by the subsidiary operations were quite varied. Over 30% of the subsidiary operations were branch offices with sales as their only function. As indicated by the SIC list, the overall activities ranged from farming to service operations. Most of the manufacturing plants were engaged in plastic and metal fabricating. The majority of the non-manufacturing operations were involved with the distribution of agricultural and oil field production equipment.

There was a significant correlation between the age structure of the plants and that of the surveyed firms in that there is a five to ten year lag between the establishment of the parents (surveyed firms) and the creation of the subsidiary operations (Table 40). The subsidiaries were relatively young in terms of the age of their operations. Over 58% of them were established during the last twelve years. Most of the regional firms established their subsidiary operations after 1976.

The characteristics of the subsidiaries for the groups of centres were not dissimilar from the Prairies as a whole. The few variations related to the location of the subsidiaries and the functions. The metropolitan firms had subsidiaries which were located in almost every region listed. The regional firms had very few firms with distribution as their major function.

The reasons that prompted the adoption of the various strategies, such as the establishment of branch plants, will be considered in relation to their spatial implications in the section dealing with location decisions. The pattern of development of the firms, as a result of the adopted strategies, is reflected in a number of internal scale variables. These variables include employment, sales, and wages and salaries.

Scale factors

The scale of operations, as measured by the number of employees, the size of the local salary/wage paid, and the value of sales, immediately after the establishment of the firm was not measured. This was mainly due to the difficulty encountered in obtaining an accurate historical account of the period. Nevertheless, a large number of the respondents did allude to the fact that their operations had humble beginnings. An attempt was made, however, to obtain information about the size of the employment, the value of sales, and the total amount of wages and salaries paid for a ten-year period (ending with the last financial year before the interview. Complete data were obtained for the beginning of the period (1969/70) and for the end of the period (1979/80) on employment and sales. Complete data on wages and salaries were made available for the last financial year only (1979/80). One hundred and seventy five firms provided employment data at two-year intervals during the ten-year period examined.

Employment

As shown in Table 41 the size of the firms as measured by the number of employees, was quite varied. During 1979/80 over 79% of the firms employed less than 100 persons. But this percentage was higher for 1969/70. The employment patterns for the metropolitan firms were similar, but there are some deviations. Regina and Saskatoon had a higher proportion of firms employing less than fifteen persons. This was also the case for the regional centres. However, during 1969/70, the majority of the firms in the regional centres employed less than fifteen persons. But, the overall characteristic of the respondent firms was toward an increase in the size of the firms as shown by the changes in the size categories (especially from less than fifteen to 15-49 people) between 1969/70 and 1979/80. Although the size of the firms was increasing, the increase was not steady.The employment data (obtained at two-year interval during the 10-year period) were used to determine the changes in the growth of the firms(Table 42). Most of the firms displayed either rapid growth or wide fluctuations. The firms in the major metropolitan centres of Winnipeg and Calgary experienced the widest fluctuations in their employment. All the regional firms, with the exception of those located in

Lethbridge, were characterized by rapid growth. Both the metropolitan centres of Regina and Saskatoon also experienced rapid growth, but Regina contained more firms with no change in their employment. Whilst the firms in the two north-central Alberta centres (Edmonton and Red Deer) were experiencing rapid employment growth, the southern centres (Calgary and Lethbridge) were characterized by wide fluctuations. Despite the different growth patterns exhibited by the various centres, nearly all the firms showed marked decreases in their employment growth between 1968 and 1973. This is the middle period discussed in relation to the growth trend of the ten industries (chapter 3). In that chapter it was indicated that the industries were characterized by wide fluctuations.

Sales

Distribution by size (value of sales) indicates that a high number of the firms had annual sales of between $100,000 and $500,000 in 1969/70 and over $1 million in 1979/80 (Table 43). The groups of centres exhibited similar patterns for 69/70. The regional centres dominated the $100,000 to $500,000. No firms reported sales of less than $50,000 during 1979/80.

Wages and Salaries

These provide another means of determining the size of the firms (Table 44). Unfortunately the data on wages and salaries were made available for only 1979/80. For the Prairies in general, 48% of the firms belonged to the

$100,000 to $499,999 category. The same pattern was evident among the various levels of centres. The regional centres had a higher proportion of firms in this category. Prince Albert had the highest proportion of firms in this category. Winnipeg, Edmonton and Calgary had the largest number of firms in the $500,000 to $5million categories.

Development Phases and Strategies

Although the surveyed firms indicated definite goals and appropriate strategies fo fulfill them, these goals were changed at various times in their life. Forty-six percent of the respondents claimed to have re-oriented their goals (Table 45). The responses indicate a close link with the strategies, in that, at least 11% emphasized an increase in the efforts devoted to the marketing of the products (Table 46). This aspect was stressed mainly by the metropolitan firms. The majority of all the changes occurred at between one and five years after the establishment of the firms in the regional and secondary metropolitan centres (Table 47). A slightly higher proportion of major metropolitan firms changed their primary goals at between six to ten years after the firms were established.

Despite the fact that not all the motives have significant effects on the choice of strategies, other variables such as age, type of ownership and the type of industry have been hypothesized to affect the actual choice of strategies. The major focus is to examine whether the development phases in the various levels of urban centres differ on their strategies for growth. An analysis of the relationship between strategy and the controlling variables is designed to indicate the patterns exhibited by the firms at a particular phase in their development. This relationship has been tested for the 197 firms surveyed and the groups of firms based on the different levels of centres. Each of the firm attributes has been tested. A multiple response analysis was used where appropriate.

The patterns of the relationship between age and strategy of the firms in the groups of centres are summarized below. Some differences from the overall Prairie pattern are evident. Only the very old companies in the regional centres showed a high preference for the creation of divisions and the creation of new companies. These two strategies were preferred more by mature firms in the metropolitan centres. Whilst the very old firms in the metropolitan centres preferred branch plants, it was the mature firms in the regional centres that showed a higher number of responses for the strategy. Although the majority of the firms chose to diversify into different markets, a higher number of responses was obtained from the very old companies in the metropolitan centres. In addition, the levels of centres differed on the number of responses obtained on each strategy. The rank (high is 1, low is 10) of each strategy is listed below:

Metropolitan Strategies

Distributor initially 8

Still distributing 10
Vertical diversification 2
Conglomerate diversification 3
Geographical diversification 1
Merger 7
Modernization 4
Divisions 6
New Companies 9
Branch plants 5

Regional Strategies

Distributor initially 5
Still distributing 10
Vertical diversification 3
Conglomerate diversification 2
Geographical diversification 1
Merger 9
Modernization 4
Divisions 6
New companies 7
Branch plants 8

The two groups of centres differed on initial distribution of other manufacturers' products, merger, formation of new companies and the establishment of branch plants. Initial distribution was more prevalent in the regional centres. Merger was preferred more in the metropolitan centres. The creation of new companies attained a higher rank in the regional centres and the establishment of branch plants was more preferred in the metropolitan centres.

The chi square statistic was used to test the difference between the number of strategies and the age of the firms for the Prairies and for the groups of centres (Table 48). Only the firms with six strategies were significantly correlated (at the 0.01% level) with age. Firms that were established between 1941 and 1950 and between 1961 and 1970 (the majority of the mature firms) showed a definite preference for the establishment of branch plants. The relationship between the adoption of six strategies and age was also significant for the five metropolitan centres combined. With regard to the individual centres, only Saskatoon and Calgary were significantly correlated with the adoption of four strategies and five strategies respectively.

Since the development phase is determined not only by the age of the firms, but also by the age of their products, to establish whether any of the development phases is associated with a particular strategy, a multiple response analysis was performed on three variables, that is, the age of the firm, the age of the products with the strategies. However, since the tables are very large a summary of the cross tabulation multiple response results is listed below,(in decreasing order of importance):

Predominant Strategies of each Development Phase

All the firms (Prairie)

1. Initially a distributor: Young firms with mature products
2. Still distributing: Young firms with mature products
3. Vertical diversification: Young firms with mature products
4. Conglomerate diversification: Young firms with old products
5. Geographical diversification: Young firms with mature products
6. Merger: Young firms with mature products
7. Modernization: Mature firms with old products
8. Divisions: Young firms with mature products
9. New companies: Young firms with mature products
10 Branch plants: Young firms with mature products

Metropolitan centres

1. same as for the prairies as a whole.
2. Young firms with old products.
3. Mature firm with mature products.
4. same as for the prairies as a whole.
5. same as for the prairies as a whole.
6. same as for the prairies as a whole.
7. same as for the prairies as a whole.
8. same as for the prairies as a whole.
9. same as for the prairies as a whole.
10. same as for the prairies as a whole.

Regional centres

1. Young firms with mature products.
2. Mature firms with old products.

3. Young firms with old products.
4. Young firms with old products.
5. Young firms with old products.
6. Young firms with mature products.
7. Mature firms with old products.
8. Young firms with old products.
10. Young firms with mature products.

A major difference between the metropolitan and the regional centres was that there were more young firms with old products in the regional centres and more young firms with mature products in the metropolitan centres. More young firms with old products in the regional centres were still involved with distributing. On the conglomerate diversification measure, the two levels of centres were characterized with young firms producing old products. The development phase composed of mature firms with mature products in the metropolitan centres was more involved with vertical diversification than any other phase. In the regional centres, the development phase composed of young firms with old products showed a preference for vertical diversification. The establishment of branch plants was associated more with the development phase that consisted of mature firms with mature products in the regional centres. However, in the metropolitan centres, the strategy could be associated more with the development phase composed of young firms with mature products.

The chi square statistic was also used to test for a difference between the age of the firms, the age of their products, and the number of strategies.'' The development phase consisting of young firms/mature products in the metropolitan centres had between two and four strategies for growth. The young firms with old products in the regional centres are typified by a similar range of strategies. Firms with over four strategies were associated with young firms/old products in the metropolitan group. Only the young firm/mature product group were statistically associated (10 chi square, 3 degrees of freedom at 99% level of significance) with the adoption of three strategies in both the regional and metropolitan centres.

Other variables, directly associated with the strategies, were also correlated with the development phases. The variables include, market areas, exports and changes in industries. The extent of the market areas was directly associated with the strategy of geographical diversification. A summary of the multiple response is given in Table 49. On the concentration of trade within the local market, the development phase comprised of young firms with old products in metropolitan centres was most prevalent. In the regional centres, the local market was preferred more by the young firms with mature products. The two sets of centres differed on the regional market. The development

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''the number of strategies involves the actual combinations of each firm. See Table 26.

phase consisting of young firms (mature products) was associated with the regional market in the metropolitan centres. In the regional centres it was the young firms with old products. The market area (in order of importance) covering Saskatchewan, Alberta, and Manitoba was associated with mature firms (old products) in the metropolitan centres. The same market area was associated with young firms (old products) in the regional centres. The market area comprised only of Alberta, was preferred more by young firms (mature products) in its metropolitan centres. Young firms with old products in the regional centres preferred this market.

On the issue of exporting throughout the period examined, the young firms with the mature products (prairies as a whole), were significantly associated with participation in the export market. The development phase comprised of young firms with old products in Winnipeg participated more in the export market than any other phase. Young firms with old products in the regional centres were significantly associated with non-export. Table 50 indicates the degree of association between the strategies and market areas. Only those firms (development phase is not significant) which have adopted two strategies with an orientation toward geographic diversification showed any significant relationship with the Alberta market. Both the distribution of other manufacturers' products and the diversification into related (vertical) lines were shown to be related to the regional market. Those firms with six strategies (especially the firms with branch plants) were significantly correlated with the regional, national and the international markets. Only the metropolitan group of Winnipeg, Calgary, and Edmonton showed any significant relationship on the strategy and market correlations (Table 50). Firms which have diversified into related products were significantly associated with the regional markets.

In terms of a significant association between a particular development phase and an industrial sector, the only significant correlation was between the young firms (mature products) and plastics fabricating. This association was only significant for the metropolitan centres.

An indication of the extent of vertical and conglomerate diversification is given in Table 51. This table shows the relationship between the development phases and the extent of intra- and inter-industrial changes. Young firms with mature products, especially in the metropolitan centres, remained in the same industrial sector throughout the period. The regional centres and the secondary metropolitan centres of Regina and Saskatoon had a higher proportion of young firms with old products in the same industrial sector.

Scale Variables and Development Phase

A major facet of the development theory of a firm is that the size of a firm is relatively small during the initial years. Although this relationship could not be conclusively established for those firms which do not fall within the period (1969-79) for which adequate data were available, the relationship can be established for the rest of the firms (Table 52A). Firms established during the 1961-70 period (mature) were significantly correlated, at well below the 0.01% level, with the employment of less than fifteen people during the 1969/70 period. Also firms established during the 1971-75 period (young) were significantly correlated with the employment of less than fifteen people. This relationship exists for the metropolitan centres as a group. But, the Regina/Saskatoon group is only significant on the 1969/79 employment and age correlations (Table 52A). Although there exists a significant correlation between age and employment (1969/70) for the regional centres, there is a difference from the metropolitan group. The regional firms established after 1951 were significantly correlated with the employment of less than fifteen people.

The nature of the scale of operation of the firms can also be established by examining the relationship between the age and the level of sales. In the two years for which complete data were available (1969 and 1979) as might be expected, low value of sales was significantly correlated with recent establishment dates and high value of sales was significantly associated with old companies, using date of establishment only (Table 52B).

The relationships between the age of the firms and the various scale or size measurements are summarized in Table 53. The results of the Spearman rank correlation show that all the size variables are inversely related to age. The relationship is significant at well below the 0.01% level. The inverse relationship means that recently established firms, at least after 1970, are significantly correlated with low to intermediate value of sales, wages/salaries and the level of employment. This relationship was especially strong for the 1969 employment. The major metropolitan groups are also significantly correlated at the 0.01% level on all the variables. The regional cities showed no significant relationships except on the 1969 employment.

When the age of the firms and their products are correlated with employment, a similar relationship was found. Young firms with old products employed less that fifteen people in 1978/79. This relationship was significant for the regional group (at 99% level of significance). Young firms with mature products in the metropolitan centres were significantly correlated with small size (less that 15 people in 1969/70). Large size was significantly associated (7 chi square, 2 degrees of freedom (df), 99% level) with mature firm (old products) in 1969/70. Firms in the same development phase were also associated with medium size (100-199) during 1969/70.

Changes in the number of employees were analyzed for each of the four development phases in each centre for the years 1968/69, 72/73, 74/75, 76/77, and 78/79(Table 54). Marked differences in employment changes emerged. Earlier, it was pointed out that the major metropolitan centres experienced wide fluctuations in their employment. However, the centres differed on the type of development phase that had such an experience. In Calgary it was mostly the young and mature firms with mature products whereas in Winnipeg it was mostly the mature firms with old products. The two centres also differed on the primary industries of the firms. In Winnipeg, the mature firms (old products) that experienced wide fluctuations belonged to a diverse group of industries. Most were in machinery, metal fabricating, transportation, and in Calgary, they were mainly in plastics fabricating. Edmonton differed from the other major metropolitan centres. Although the majority of the Edmonton firms were in the same development phase as Calgary, they experienced rapid employment increases. Also, the firms belonged mainly to the oil and gas production equipment. The secondary metropolitan centres of Regina and Saskatoon were similar in their employment changes. The majority of the firms were young with old products and they experienced little or no employment change. They also belonged to mostly the miscellaneous machinery industry. Rapid increases were experienced by the Saskatoon firms in the same development phase. These firms belonged to the agricultural implement industry. Most of the Regina firms in the latter industry experienced either wide fluctuations or rapid increases and they were mainly manufacturing mature products. The regional centres displayed some similarities in their employment changes. Rapid or wide employment increases existed among the young firms (old products).

When the age of the firms and the age of their products are correlated with sales for 1969/70 and 1978/79, a similar relationship was found. Young firms with mature products had low value of sales ($50,000-99,000) in 1978/79 (7 chi square, 2 degrees of freedom, 95% level). At the same time a high value of sales (over $5million) was associated with mature firms producing both mature and old products. In the first financial year (1968/69), high value of sales was associated with the development phase that consisted of mature firms with both mature and old products (8 chi square, 3df, 95% level). Only the five metropolitan centres and Winnipeg (individually) exhibited significant correlations between sales and development phase. For the five metropolitan centres (as a group) in 1968/69, large sales were associated with mature firms (mature products) and in 1978/79, medium-sized sales ($1million to $5million) were associated with young firms with both old and mature products (12 chi square, 3df, 99% level). Young firms with mature products in Winnipeg in 1968/69 had high value of sales. There was only one significant correlation on wages and development phase. Mature firms with old products were associated with medium-sized wage levels. Young firms with old products in Winnipeg were associated with either low or high wage levels (11 square chi, 3df, 99% level).

Another scale variable, the number of product lines, was used to test for any significant association with the development phases. The production of three lines was associated with young firms (old products), and the production of two lines was associated with young firms (mature products).

Summary of the Strategies for Growth by Prairie Firms

The strategies adopted for growth by Prairie manufacturing firms are numerous. The strategies have been viewed not only in terms of the changes in the number and type of the products, but also in terms of the methods used in achieving the changes. The latter factor refers to the various diversification measures (internal expansion) achieved at a single location, and external growth accomplished through merger and/or the establishment of branch plants.

Firms are associated with particular strategies at different ages. If the delineation of the firms into young, mature and old based on the age of the operations and the age of the products is accepted as being representative of different development phases, then it can also be accepted that differences exist betwen development phases on the strategies chosen. However, certain strategies are common to all the age groups in the different locations. The main trend among all the age groups is the preference for the three internal diversification measures: vertical, conglomerate, and geographical. Most of the firms, especially in the secondary and the regional centres, remained in the same industrial sectors throughout the period examined. In the major metropolitan centres the most common inter-industry changes occurred between metal fabricating and machinery. On the basis of the development phase delineation, the young firms with mature products in the metropolitan centres remained in the same industrial sector throughout the period examined. In the regional and the secondary metropolitan centres most of the young firms with old products remained in the same industrial sectors. In terms of industry association, only the plastics fabricating industrial sector was associated with a particular development phase (young firms with mature products in the metropolitan centres). In addition, the young firms with mature products in the metropolitan centres and the young firms with old products in the regional centres showed a definite preference for the regional market. These development phases were also associated with the distribution of other manufacturers' products and vertical diversification. The young firms with mature products participated in exports. Non-export was significantly associated with the young firms with old products in the regional centres. Firms in this development phase reoriented their goals at between one to five years after establishment. The metropolitan firms concentrated more on the export market whilst the regional firms put more emphasis on internal marketing. With the exception of the oldest group, the majority of the firms gained entrance into the manufacturing industry through the distribution of other manufacturers' products.

The major differences among the development phases relate to the external growth strategies. In addition to the internal diversification measures, the older firms have a definite preference for branch plants, the creation of divisions, the creation of new companies, (including joint ventures), and modernization. In terms of the company structure, nearly all the functions are performed in the main office, except for budgets, loans, investments, and legal services. These services are mainly performed through parent firms (especially in the regional centres). The latter may well contract this work out to other service firms. Also, the regional centres relied more than the metropolitan centres on independent companies for some of the functions, such as accounting and management services. The Alberta firms have the highest number of subsidiaries. Most of them are located in the United States and they performed varied functions. There was a five to ten year lag between the establishment of the interviewed firms and the creation of their subsidiaries. The mature firms have indicated a leaning toward acquisition or merger as well as the internal diversification measures.

There were a number of differences between the development phases on the size variables. The young firms with old products were significantly associated with small size in the regional centres. Large size was associated with the mature firms with old products for the whole of the Prairies. In general, there was a higher number of small firms in the regional centres and in the secondary metropolitan centres. Between 1969 and 1979, an increase in the size of the firms occurred. The increase was marked by various changes. Rapid employment growth was characteristic of the regional centres, the secondary metropolitan centres (the young firms with old products in the agricultural implement industry), and Edmonton (the young firms with mature products in the oil and gas production equipment). Widely fluctuating employment growth typified Calgary (young firms with mature products in the plastics sector) and Winnipeg (mature firms with old products in a diverse number of industries). Nearly all the firms conformed to the trend exhibited during the middle period (1968-73) as defined in the time series analysis performed on the industry data. Marked employment decreases were experienced during this period.

Further details of the strategies, in terms of the reasoning underlying the choice of the strategies and their spatial manifestations, are considered next.

D. Attitude and Experience in Research and Development

Characteristics of Innovation

One strategy which is closely related to those already mentioned is that of product/process innovating. Initially, for the purpose of this study, innovation was defined as the first commercial introduction of a new product in a particular form. Products that perform similar functions may already be on the market. A basic premise of this study is that the development of a firm is influenced by the extent of the efforts devoted to innovation. Innovation may be viewed solely as a goal or as a means of achieving other goals. As mentioned earlier, firms enter the manufacturing industry at different stages of the product's development, an entry precipitated by various reasons. One of the reasons involves the desire to bring an invention (an idea for a new or improved product/process) into commercial production. But as already seen, only about 4% of the respondents were prompted by this desire. However, in the majority of the cases, inventions (and subsequent innovations) occurred after the firms were already established.

The periods when the innovation process commenced within the surveyed companies are listed in Table 55. The use of periods is particularly appropriate because most of the respondents claimed that the process was gradual and often not formalized. As shown in the table, most of the firms commenced their research and development activities after 1961. The existence of a lag between the time when the firms were formally established and the time when innovation commenced can be proven by correlating the two variables. This relationship was correlated at well below the 0.01% level of significance. A high proportion of the companies established in the two preceding periods before 1960, commenced their R & D activities after 1960. Some firms established during the 1961-70 period also commenced their R & D efforts during the same period.

During the course of the interviews it became clear that a great deal of difference existed in the ways the respondents were defining innovation, compared with the definition presented by the interviewer. Therefore, it was necessary in the end to accommodate their definitions. The frequency distributions of the various forms of innovation are listed in Table 56. The majority of the cases have between one and three innovations, that is, based on patented inventions. Forty-four cases claimed to have innovations (by their definitions) for which there are no legal bases. Table 56 also shows the distribution of innovations for two levels of centres. There were some differences between the two levels of centres. A higher proportion of the regional firms had patents which were taken out by their parents (located elsewhere). This indicates the higher dependence of the regional firms on external innovation. Also, the regional centres relied more on machinery designed and manufactured in-house.

Development phase and invention

There was only one statistically significant relationship between a development phase and the number of patents. Mature firms with mature products in the metropolitan centres took patents out. In Winnipeg, the significant association was between the mature firms with old products.

Development phase and types of innovation

It should be pointed out that this study deals with the typical range of technological innovations introduced by firms during their usual business activities. This study is not oriented toward new technologies which change the whole course of technological development, for example, as in the case of the telephone. With this orientation in mind, the various innovations encountered have been classified into five subjective types:

1. an innovation leading to a completely new technology
2. an innovation which makes currrent technology obsolete
3. an innovation which causes major changes in current technology
4. an innovation which causes slight changes in current technology
5. an innovation which makes no difference to current technology.

On the basis of this differentiation, a multiple response analysis was performed on the variables, since the responses indicated that the firms have more than one type of innovation (patented inventions only). As Table 57 indicates, the majority of the responses fall into the type three and type four categories. A maximum of two responses were provided by each firm. The actual combinations of the various types of patented innovations are shown in Table 58. Type four was the most frequently mentioned. Forty three of the 96 responding firms indicated type four.

A summary of the multiple response analysis between development phase and innovation type is presented in Table 59. The young firms with mature products were responsible for most of the innovation types except for the most and the very least radical innovations (that is, 1 and 5). The mature firms with old products were particularly associated with very minor innovations. There were some significant differences between the metropolitan and the regional centres on development phase and innovation types. The regional centres were not represented at all in the most radical innovations, that is, 1 and 2. The moderately radical innovations (3 and 4) were associated with mature firms (mature products), whereas in the metropolitan centres, the young firms with mature products were responsible for the majority of the innovations in the category. On the least radical innovation, again the regional centres differed from the metropolitan centres. The young firms with mature products in the regional centres were largely responsible for the minor innovations.

Sources of Innovation

Perhaps the predominant occurrence of innovations in the type three and type four categories, can be explained by examining the sources of the ideas for the innovations. The sources were found to be closely related to the reasons behind the innovations. A summary of the sources of the innovations is given in Table 60. Although the majority of the firms indicated that the ideas originated with the employees, a significant number of the firms also specified the origin to be with independent inventors or a combination of independent inventors and employees of the firms. This was significantly associated with the young firms with mature products (prairies as a whole). What is implied by the various origins is that most of the innovations encountered were really a combination of some need and technical possibility or the technical solution for the need. The individuals with the need were often divorced from the individuals who provided the solutions, that is, the employees of the companies. The customers who provided the firms with explicit details of their needs were in part responsible for the resulting innovations. In some cases, as shown in Table 60, the inventions were patented by independent inventors (mostly all customers) and the rights assigned to the companies, and/or patented jointly by the companies and the customers.

Organization of R & D

In addition to the differences encountered on the definition of innovation, it was found that the majority of the respondents viewed the research and development leading to the innovations, mainly as product development or modification. The summaries of the extent of the respondent's involvement are presented in Tables 61 to 63. The majority of the respondents acknowledged the existence of an R & D department, but the responses to the size and the nature of the R & D department showed these departments to be small (usually consisting of the owner and one or two others) and informally organized. The R & D departments were not separated from the other departments within the firms. In other words, the individuals (excluding the owners) responsible for providing the solutions to the product development problems, were often associated with other departments, such as engineering, design or production.

Development phase and research and development

For the Prairies as a whole, the young firms with mature products were significantly associated with the ownership of R & D sections. The R & D activities were carried out in their own facilities. There was no significant relationship for the different level of centres. Winnipeg differed from the other centres having a significant number of firms with R & D sections. Most of the firms were mature with mature products. The mature firms with old products (prairies) regarded their R & D sections not as a profit centre, but as an essential part of their operations. Again, most of the firms in this category were located in Winnipeg. However, in Brandon, the few firms (mature with old products) regarded their R & D sections as a profit centre. In the major metropolitan centres especially, R & D sections were claimed to be part of general marketing policy. This assertion was significantly associated with the mature firms with old products.

Effects of innovation on firm development

The product development and a firm's development are invariably interrelated. It has already been demonstrated that several classifications of firms can result from this relationship, for example, young firm/old products. The previous discussion centred on the age of the products as measured by the time when the products came on the Canadian market. But, no reference was made as to whether the products, regardless of the number of years on the market, were based on any form of innovation[12] (patented and unpatented). Also, several questions with regard to the relationship between the number and/or the type of innovation and the attributes of the developments need to be answered. Some of the questions are:

1. Does innovation occur more often in firms of particular ages, sizes, and industries in particular locations?
2. Is there any association between the choice of strategy for growth and the number and/or the type of innovations?

With regard to the first question, the significant relationships were between the number of innovations and (i) industry type; and (ii) the ages of the products as measured by the number of years on the market (Table 64). For the Prairies as a whole, the firms which belong to the miscellaneous plastics, prefabricated building, farm implement, and oil field equipment groups were significantly correlated with the possession of one patented innovation and an unspecified number of unpatented innovations. No relationship could be established for the individual centres or the groups of centres. Firms producing items which have been on the market for between 11 and 30 years showed a significant association with the generation of one and/or two patented innovations plus an unspecified number of unpatented innovations. Only one direct relationship could be established between development phase (age of firm/age of product) and the number of innovations. The mature firms/old products group were statistically associated (8 chi square, 3df, 95%) with the generation of one innovation. A larger number of firms in the same group also claimed that they built their own machinery. Many of the firms in the young firms/mature products group indicated that they have generated more than 3 innovations, although no statistically significant relation could be established. A relationship was also established between firms with old products and the generation of one innovation. Firms with old products were significantly associated with unpatented innovations. These relationships were only significant for the metropolitan centres.

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[12] Attention is focused only on those inventions which have been brought into commercial production. The respondents were also asked about the total number of patented inventions, which may or may not have been brought into commercial production.

Several significant relationships were obtained in support of a positive answer to the second question proposed above. Initially, a multiple response crosstabulation was employed (summary is provided in Table 65). A relatively large number of firms responding to the internal diversification measures have also indicated they possess nearly all the various forms of innovations. Differences existed between the two levels of centres on the strategies associated with the various types of innovation. Firms that relied on parents for innovation were more specialized in the metropolitan centres than in the regional centres where the firms have adopted the three strategy diversification measures. On the actual number of innovations, those firms with large numbers of innovations were also associated with the adoption of numerous strategies. In addition to the internal diversification measures, the creation of divisions and branch plants were adopted by the metropolitan firms. The regional firms adopted the internal diversification measures as well as modernization and distribution. In general, the metropolitan centres were more specialized based on the strategies adopted and type of innovation than the regional centres. The adoption of three and five strategies were positively associated with the number of innovations.

To limit the heterogeneity of the firms responding to the various forms of innovations, the firms were separated and grouped into patented and unpatented innovations. Those firms which claimed the construction of their machinery, were included in the latter group. Both groups were then correlated with the controlling variables. The significant associations are presented in Table 66. For the patented group, the number of innovations generated was clearly correlated with (i) the size of the firms (as measured by the wages paid and sales, in 1978/79), (ii) the type of industries, and (iii) the ages of the products. The patented group in the regional centres showed no relationship on any of the correlations. The unpatented group was only significant on the size variables (for all the prairies).

In general, both the small and large firms were associated with at least one innovation. The small firms with one innovation belonged to the farm implement and metal fabricating industries and most of their products have been on the market for between 21 and 50 years, that is, old products. The medium and large firms were associated with not only one innovation but also with over six innovations. Most of their products have been on the market for between eleven and twenty years (young to mature). The major metropolitan centres (as a group) were associated with one innovation and small firm size. All the metropolitan centres (including Regina and Saskatoon) showed the same pattern as for all the firms. The centres also showed a relationship between one innovation and the manufacturing of numerous product lines.

So far, the discussion on innovation has centred on "in-house" product innovations (patented and unpatented). However, there is at least one other means for a firm to enter the innovation process. It involves licensing, which is a way of acquiring the latest technology. Licensing is not only an innovation strategy but it is also a strategy of growth in general. It provides an easy access into the market and does not require the presence of a formal R & D section. The extent of the R & D involved is dictated by the conditions of the licensing agreement. Often the licensing strategy is combined with "in-house" product innovations. An initial licensing agreement also facilitates the accumulation of knowledge, thereby enabling a company to commence an "in-house" innovation programme once the agreement has been terminated.

The survey response on this aspect is presented in Tables 67-68. At the time of the survey, about 26% of the respondents were involved in some form of a licensing agreement. Most of these licenses were granted by firms located in the U.S.A. and other foreign destinations where R & D was located, thereby indicating the continued existence of a dependence on the transfer of technology from other countries. There is no significant relationship between licensing and the existence of R & D programmes. Mature firms with old products in metropolitan centres were significantly associated with the ownership of licenses that were granted by firms located in the United States.

Views expressed on innovation

The effects of "in-house" product innovations, licensing, and the other forms of innovation on the growth of a company can be explained either through an examination of the annual value of turnover (monetary), or through a qualitative assessment. An attempt was made to obtain information on both methods.

The information obtained on the monetary evaluations was limited. Most of the surveyed firms were private companies and the respondents were rather reluctant to discuss the actual monetary effects of innovation on the growth of their profits. Satisfactory responses were obtained on the questions dealing with the amount of R & D undertaken and the number of products generated from their R & D activities. The responses on these aspects are presented in Tables 69 to 71. Most of the firms have undertaken some R & D activities and spent between 0.05% to 5% of the value of their sales during the past five years on R & D. Twenty-four percent claimed to have generated all their products from their internal R & D activities(Table 70). About 75% relied solely on their parents(Table 71). A significant association was established for the young firms with mature products.

With regard to the second method, the respondents were more open. The various responses obtained are given in Table 72. On the importance of innovation to the continued growth of a firm, 44% of the respondents viewed it as being a necessity but not crucial for survival. This view was significantly associated with the mature firms with mature products in the metropolitan centres. However, 38% of the respondents considered innovation to be a necessity as well as being crucial for survival. The latter view pertains especially to the firms in Regina and Saskatoon, where a large number of the surveyed firms are producing old products.

On the contribution of R & D activities to aspects of performance, the responses ranged from a low contribution to a substantial contribution (Table 73). The contribution of R

& D activities to the growth of sales and reputation was ranked slightly higher than the rest of the performance aspects. There was no difference between the metropolitan and the regional centres. Also, no significant relationship between the development phases and performance aspects could be established.

Some insights into the role of the transfer of technology as it affects subsidiaries can be ascertained from Table 74. The question on the effects of an affiliation with a parent on a company's R & D activities generated a multiple response (Table 74). A maximum of three different responses per respondents were obtained. Most of the executives (34%) indicated that their parents did not influence their R & D activities. Fifty-seven firms (29% of the total number of firms interviewed) were involved, the majority (35%) were located in the major metropolitan centres. The responses of the metropolitan firms were interesting in that the results of any R & D activity were made available to them by their parents. Their responses indicate a greater reliance on external (that is, to the Prairie region) innovation. This reliance is also reflected in the extent of control exercised by the parents (Table 75). Most of the respondents claimed that their day-to day operations were partly supervised, but of more importance is the fact that their policies were supervised extensively. None of the views was significantly correlated with the location of any of the foreign owners or a development phase.

A wide range of views were expressed on the state of innovation in the respondents' industry, the obstacles to an effective R & D programme, and the solutions to the obstacles (Tables 76-80). Although the majority of the respondents were optimistic about the future, this optimism was expressed with reservations. These reservations were, to some extent, linked with the obstacles. The most cited condition involved government standards and conservation(Table 78). Only the development phase of young firms with mature products in the metropolitan centres (except in Winnipeg, where it was mostly mature firms with mature products) was significantly associated with the optimism that good prospects for energy saving innovations could be found.

The views expressed on the solutions to the obstacles were just as varied as those offered on the condition of R & D in their respective industries. On the one hand, no government interference was favoured, and on the other hand, more assistance in the form of non-discretionary finance of R & D, of the actual marketing of the innovation was preferred. Generally, most of the responding firms were in favour of some type of government action as listed in Table 78. Further evaluation of government involvement with reference to specific programmes was also sought from the executives. The results of this evaluation will be presented in a latter section.

E. Government Programmes

Government programmes, especially those that offer financial assistance, including taxation incentives, generate an impact on a firm's industrial performance. The Federal Government offers three types of incentives - taxation, general and selective. The taxation incentives are provided under the Income Tax Act. These are generally favoured because they are statutory and non-discretionary, but the emphasis has been shifting to the provision of more discretionary incentives. The shift has been necessitated because the income tax incentives favour firms that are making some profits. New and/or small firms that need assistance on R & D could not claim the benefits because their profits were too small to absorb the allowance available to them. An analysis of the taxation incentives was beyond the scope of this study primarily because the respondents evaluated only the general and selective programmes administered by government departments other than Revenue Canada. But a number of significant industrial incentives found within the Income Tax Act that are relevant to this study include:

1. Investment Tax Credit for scientific research expenditures. This allows for a 25% deduction from income.
2. Accelerated Capital Cost Allowance for machinery and equipment used in manufacturing and processing. The cost of machinery and equipment can be depreciated in two

years.

3. Investment Tax Credit of 7% (higher in areas covered by the Regional Development Incentives Act) on the purchase of new buildings or equipment (including scientific research expenditures.
4. Sales and Excise Tax exemptions on: scientific research equipment to be used in developing new products and processes, farm implement, and equipment to be used directly for energy development.

A summary of the highlights of both the Federal and Provincial government programmes that are relevant to this study are listed in Tables 81 & 82.

A number of general features are associated with these programmes. Prior approval is usually a necessity before any firm can obtain financial assistance. The firms must not have any prior commitment to institute the project before applying for government assistance. They must also be able to demonstrate that the project cannot be completed without government aid. A great deal of finesse is needed in trying to convince the government agency involved that the company has the technical, marketing, manufacturing, financial and managerial skills to carry out the project. Also, the company has to prove that the project will benefit Canada in terms of (i) employment, (ii) expansion of other industries and services, (iii) expansion of Canadian exports, and (iv) use of Canadian manufactured goods (Doherty and Whinney, 1981). Inability to obtain government assistance is due largely to the company's:

1. failure to carry out adequate market analysis on the type of buyers and the location of buyers.
2. failure to focus on the critical issues. Often the companies use rather laboured and flowery language.
3. failure to illustrate the expected financial results.
4. failure to match capital and labour requirements with the sales forecasts (Doherty and Whinney, 1981).

The surveyed firms were asked to evaluate a number of federal(general and selective), provincial, and municipal programmes on the basis of certain criteria, and also to specify the frequency of use of each programme. Unlike most municipal authorities in the United States, the Canadian municipalities offer assistance mainly in the form of information dissemination. Municipalities in Canada are controlled by very tight statutes, which restrict the provision of tax incentives (especially in the form of property tax reductions) to industrial establishments. The information provided is usually on markets, services, and industrial parks. Most of the Prairie centres have economic development or industrial commissioners. Their responsibilities, apart from information dissemination, are centred on developing regional economic profiles and promoting economic development for the region. The Federal government does administer three community-based programmes. These are addressed to the managers of the communities, rather than to the individual enterprises. They are the

Local Employment Assistance Program (LEAP) and the Local Economic Development Assistance Program (LEDA) directed at areas of very high unemployment and slow growth. Funding is given to non-profit organizations, community groups, co-operatives, and voluntary agencies to institute viable business enterprises. The Canada Works Program is aimed at creating additional employment to counterbalance seasonal employment fluctuations. None of the municipal programmes was evaluated because they had very little direct effect on the respondents who were, in fact, not familiar with the programmes.

The frequency of use of government programmes is listed in Table 83. Only those firms which have applied for and received financial assistance under the programmes are listed. The survey returns show than 49 firms in the sample from the Prairies as a whole, have taken advantage of the financial assistance offered under the Regional Development Incentives Act (RDIA) administered by the Federal Department of Regional Economic Expansion (DREE). Firms have also availed themselves of the Federal Government Industrial Research Assistance Program (24 firms), the Program for the Advancement of Industrial Technology (PAIT)- now subsumed under the Enterprise Development Program (21 firms), and the Federal Export Services (22 firms). The federal export programme also received the highest number of repeat users. The use of DREE was significantly associated with mature firms with old products. Nearly all the responses on the

DREE (RDIA) programmes were obtained from firms located in Manitoba and Saskatchewan. There was no response on two of the programmes listed: the Canada-Alberta Nutritive Processing Agreement and the Canada-Manitoba Industrial Development Agreement.

In addition to the question on the frequency of use, all the respondents were asked to evaluate, through ranking, the various federal and provincial programmes taking into account the effects of the programmes on the needs of their companies. Only those firms which have actually applied for and received some financial assistance evaluated the programmes listed. Several attempts were made to persuade the non-assisted firms to evaluate the programmes, but it was found that the respondents either became incensed by the mention of the word "government" or pleaded ignorance. In order to accomplish the evaluation, the respondents were presented with several identical sets of eight bipolar scales.[13] Initially a K-S test was performed to determine whether the number of responses on each bipolar scale in terms of the designated criteria for each program, would be significant. With the exception of IRAP, PAIT, RDIA, and the federal export services, there was no significant difference in the number of responses on each bipolar scale of the designated criteria for the other programmes. In other words, a somewhat uniform number of responses were obtained on each bipolar scale for the rest of the programmes. Those criteria with the significant number of responses on each scale have been marked by an asterisk.

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[13] Since these tables are cumbersome only a summary of the findings on the rankings is provided.

Varying responses were obtained on the designated criteria. This variability can be examined by grouping the scales into negative and positive responses.

Programmes which attained negative responses in terms of the designated criteria are:

1. DIP on the speed of processing applications and receiving the assistance.
2. PAIT (now subsumed under EDP) on the speed of processing applications and receiving the assistance.
3. DREE(RDIA) on the speed of processing and releasing the grants.

The following programmes received positive responses:

4. IRAP on all the criteria except the speed of processing.
5. PAIT on all the criteria except the speed of processing.
6. DREE(RDIA) on all the criteria except of processing.
7. Federal export services on all the criteria.

On the basis of this evaluation it is apparent that the respondents were more favourable in their assessment than one would have expected, judging from the prevalent adverse reaction of Prairie businessmen toward federal intervention in general. But, since the publicly-assisted firms were the only group to show enough interest in evaluating the programmes, then their responses may well indicate the degree of overall recognition of the importance, relevance and significance of government assistance.

Development phase and government programmes

The respondents were also asked about the specific influence of the programmes on their companies. Multiple responses were provided on this question. The responses are listed in Table 84a & b. Government programmes provided a good exposure to the export market, enabled projects to be undertaken and facilitated expansion. The government programmes exerted little influence on the creation of new companies.

Most of the influences were on the young firms with mature products in both the metropolitan and regional centres. The only difference between the two was with the production process, which affected the old firms with mature products in the regional centres most.

As a final note on the evaluation of the government programs, both the publicly-assisted and the non-assisted firms were prompted to give at least one comment on the topic. A summary of the comments is given in Table 85. Overall, 100 companies responded. About 40 of the responding firms were critical of the effects of the government programmes. Out of this group, 16 firms had applied for assistance before, but were turned down. This rejection seems to have left them rather bitter. Regina and Saskatoon yielded the lowest number of negative responses. But not all the firms were negative. Twenty-three firms acknowledged that their projects were undertaken more readily because of the assistance. Regina and Saskatoon firms responded favourably on this aspect. The biggest influence on the firms located in the regional centre was on the construction of a new plant.

On the 'overall comment', the publicly-assisted firms were isolated from the rest and the frequency distribution of their responses was obtained. Twenty-one of the 87 publicly-assisted firms did not respond. The majority of the responding cases admitted that the programmes did enable them to undertake their projects more readily. Only about 15% reacted adversely to the programmes and about 6% would have undertaken their projects even without government assistance, an indication of windfall behaviour. Such behaviour has recently been documented by Hewitt (1981). He found that radical windfall behaviour was characteristic of firms in the chemical and machinery industries.

Development phase and effect of government programmes

The development phases were correlated with the use of government programmes. The results indicate that DIP, IRDIA, IDAP and the federal export programmes were used frequently by the young firms with mature products in the metropolitan centres. This group also admitted that the programmes enabled their projects to be completed.

Industrial incentive programmes administered by DREE and those under the EDP were used mostly by mature firms with old products in the metropolitan centres (especially Winnipeg). The programmes were used by metropolitan firms for expansion and in the regional centres, they were used for the construction of new facilities.

F. Location Decisions

The strategies have been viewed mainly as investment decisions. Differences between the different levels of centres on the decisions have been detailed. The questions presented to the respondents were designed to indicate or reflect their strategies for growth and to indicate the stresses leading to the choice of a particular location decision. The major premise behind the spatial orientation is that there is a relationship between the type of location decision, other than the initial location undertaken and certain attributes associated with the development of firms making the location decisions. The relevant attributes include age, size and the type of industry to which the firms belong. The most frequently made decision was on relocation, followed by expansion in situ, then the establishment of a branch, and lastly, acquisition. The different levels of centres showed no deviation from this order.

Development phase and location decisions

To provide some validity to the hypothesis that there is a relationship between the type of location decision undertaken and the type of firm making that decision, the Kruskal-Wallis analysis of variance test was employed. This type of one-way analysis of variance by ranks is appropriate because the variables have the properties of ordinality and since the firms are to be grouped on the basis of the development attributes, it is useful in deciding whether the resulting groups differ in their ranking of the location decision factors. In other words, where a significant relationship exists, then the groups differ in the ranking of the location decision factor.

The results indicate that the firms making the different location decisions, in terms of the degree of importance of the factor to the firms, differed with respect to age and size (Table 86). The differences on each location decision are considered below.

Relocation

Most of the complete transfers or relocation were single intra city moves (Table 87). The various inter-city moves were also within the same province (Table 88). In addition, over 30% of the respondents indicated that the relocations occurred since 1971 (Table 89). The various age groups for the firms alone and size groups (as measured by employment, sales and wages) differed in their ranking of relocation factors (as listed in Table 86 section A). The ranking on the efficiency of a building varied significantly with the firm age groups and the size of the companies (wages). Mature and medium-sized companies considered the factor to be highly important. It was of little importance to the old, young, small and large firms. Mature firms with mature products in Saskatoon were influenced more by the benefits of government incentives than the other firms in the same development phase in the other centres. The mature firms, but with old products in Lethbridge, Saskatoon, and Calgary were influenced to relocate because of managerial preference to reside there. The decisions of the young firms with mature products in Winnipeg, Red Deer and Edmonton to relocate were stimulated by the proximity of new market. The overall effect of an improved environment also played a key role in the relocation decisions of young firms with mature products in Red Deer, Edmonton, and Calgary (all Alberta locations).

The importance attached to the attraction of lower rents varied with the size of the companies (as measured by the 1979 wages and value of shipments). This factor was ranked highly by small to medium-sized companies. Large companies rated the factor low. The importance of the sale of an existing site also varied with the size of the companies. The factor was rated highly by medium to large companies, whilst small to medium-sized companies gave the factor a low ranking.

Branch Plants

Details of the characteristics of subsidiary operations, including their actual locations, have already been presented in relation to the strategies adopted for growth. With regard to the ranking of the factors influencing the location of branch plants, this varied significantly with the development phase and particularly with the size of the companies (Table 86B). Mature firms with mature products in Calgary established branch plants mainly as a result of the decision to have designated products manufactured in the chosen locations. The proximity of other plants of the company/parent company was highly influential in the decision of young firms (mature products) to establish branch plants.

The availability of unskilled labour, government inventives, and an untapped market were considered differently by the groups of firms. Large firms in 1969 and 1979 obtained higher mean ranks on the availability of government incentives than the rest of the firms. Large firms in 1969 also considered the availability of unskilled labour to be a highly important factor in their decision to establish a branch plant. The presence of an untapped market as an influence on the establishment of branch plants, was ranked higher by the small to medium-sized firm (as measured by the 1979 employment) than the rest of the groups. The large companies, in particular, indicated low rankings on the factor.

Acquisition/Merger

Only a few significant relationships could be established between merger factors and the development phase. The main significant response of the various development phases on their decisions to merge with or acquire another company was on the need to solve a slow growth problem. Mature firms with old products in Saskatoon and Edmonton were particularly prompted to become involved in a merger/acquisition activity because of a slow growth problem. This finding lends some support to the conclusion of the Royal Commission on Corporate Concentration that old firms tend to choose the merger alternative rather than innovation. The ranking on the maintenance of market share varied with the size of the companies (1969 employment) as did the ranking on the availability of government inventives (size: 1979 value of shipment). On the one hand, those firms with sales of between $50,000 and $90,000 in 1969 (small firms) obtained higher mean ranks on the government factor than the rest of the firms. On the other hand, large firms (1969 employment) placed a greater emphasis on the maintenance of market share, as an influence on their acquisition of or merger with another company, than the small to medium-sized companies.

Expansion-in-situ

Factors influencing expansion in the same location varied between cost and available land, with the size of the company (sales) and age (Table 86D). The Edmonton and Calgary mature firms(mature products) decided to expand on their existing premises because of the need to maintain contacts with customers, suppliers, and purchasers. The same reason was considered to be highly important by young firms (mature products) in Calgary. The need to maintain contacts could also imply the influence of inertia. The ranking on the availability of adjacent land varied with company size

(1969 employment). Both the rankings on the importance of the lower cost of expansion-in-situ and the availability of land on existing premises varied with company size (1979 sales). On the one hand, those firms with less than $100,000 in sales (small firms) obtained higher mean ranks on the importance of the lower cost of expansion in situ, than the large companies. On the other hand, those firms with over $5 million in sales in 1979 (large firms) received higher mean ranks on the adequacy of space on existing premises or land as a factor underlying expansion in situ.

A summary of the association between the location decision variables and the development phase controlling variables

The Kruskal-Wallis analysis of variance by ranks has indicated the location decision factors over which the various firm age groups - as defined by the age and size - varied. In addition, a test of association was made between the location decision variables and the controlling variables for all the firms. The Spearman Rank Correlation coefficients provide a means of summarizing the strength of association between each pair of variables. The associations are rather weak and may not, therefore, be generally applicable in another region or in another time period. In Table 90, the significant association variables are presented.

Eight location decisions were significantly associated with firm age. Three of these were inversely related to firm age, two on relocation and one on the establishment of branch plants. The release of capital from the sale of an existing building and the proximity of a new market and/or key supply as deciding factors on relocation were ranked highly by mature companies. Mature companies also ranked the availability of government incentives in prompting the establishments of branch plants highly.

The sizes of the firms, as measured by the 1969 and 1979 employment, were associated with nine and five location factors respectively. On relocation, the efficiency of a building and the improved environment were correlated with small to medium-sized companies (1969 employment). Lower rents, managerial enthusiasm, and improved environment were also associated with small to medium-sized firms (1979 employment). Inverse relationships were obtained on factors of expansion in situ and company size (1979 employment). Lower costs and the maintenance of contacts were ranked highly by small to medium-sized firms.

The correlations between location decisions and the 1969 and 1979 sales yielded only seven significant associations (three on the 1979 sales and four on the 1969 sales). On relocation, a high ranking was placed on lower rents by small firms (1969 sales). Small firms (1979 sales) placed a high ranking on low labour turnover. With regard to merger and expansion in situ, small to medium-sized firms placed high rankings on the retention of market share and low costs of expanding in situ respectively. Although the correlations suggest that the location variables are associated with the development factors, the overall association is general and as indicated by the coefficients, rather weak. The strongest direct associations obtained are between the establishment of branch plants and the size of the companies as measured by the level of employment in 1969 and 1979. The maintenance of market share (merger) and the level of sales (1979) coefficient was the strongest inverse association obtained.

G. Constraints On Growth and Development

The discussion on innovation and government has demonstrated that the degree to which the two factors can be considered crucial to the growth process of a firm is varied. It has also been shown that Prairie firms do adopt many strategies, including innovation in order to fulfill specific goals. But, in implementing the chosen strategies, a firm is likely to encounter certain constraints. The character of the problems encountered at each development phase inevitably varies. To determine the occurrence of such a relationship among Prairie firms, the various constraints mentioned above were first correlated with the age of the firm (establishment date), then with the product age/firm age variables. In addition, independent variables such as the type of industry and the size of the firms were also correlated with the constraints. The evolutionary process of a firm may be influenced by the nature of the industry to which it belongs.

The significant relationships are shown in Table 91. Labour problems were associated with the firms established after the Second World War. The firms established between 1940 and 1951 were besieged by financial problems in the past. This problem is common also to firms established over the last two decades. The latter firms also complained about insufficient government assistance. When the different level of centres are considered, the significant relationships are only slightly different. The older firms in the three major metropolitan centres were beset by a lack of budgetary control. High transport costs and the small domestic market were considered to be problematic by the same age group of firms. The young firms viewed the labour costs as a future problem. The Regina/Saskatoon group was only significantly correlated on the effects of competition for labour with large companies or larger projects in the area. This competition was considered to be a continuing problem by those firms established during the post Second World War period. The regional centres were associated with problems involving the lack of borrowing power, the cost of land and capital, low market growth, and technological obsolescence of products.

Several problems were associated with the various development phases. The associations are more statistical than causal because the firms in the various groups were not specifically asked whether their age was responsible for their problems. The young firms with mature products in the metropolitan centres faced the continuous problem of lack of skilled labour (especially fabricators), lack of borrowing power, labour stability, product problems, high transport costs, uncertainty over government economic policy, and high cost of land. Only two constraints were significantly associated with this development phase: high labour costs (9 chi square, 3df, 95% level) and lack of management resources (8 chi square, 2df, 99%). Many of the firms in the same development phase in the regional centres indicated thay they lacked top level management. Firms in the same development phase, especially in the metropolitan centres, expressed the desire to relocate to the United States, if their problems could not be satisfactorily solved in their existing locations.

The majority of the firms in the young firms/old products group in both level of centres indicated that they lacked adequate equipment skilled labour (especially welders - in the metropolitan centres - and mechanics in the regional centres) and were constrained by high transport costs. The associations were not statistically significant. The young firms with old products (in the metropolitan centres) indicated that they would expand into other fields if their current problems were to become unmanageable. In the regional centres, many of the respondents would consider selling their firms.

Many of the firms in the mature firms/mature products category expressed concerns over the lack of skilled labour (especially tool and die makers).

Most of the firms in the mature firms/old products category also expressed concern over labour (particularly, the lack of tool and die makers) and the economic climate. The lack of a financial system supervised by a controller to appraise investment opportunities in the past was a disadvantage to this groups. The high transport costs and government interference were also felt to be a problem in the future by firms in the same development phase. A high proportion of respondents in this group would consider transferring the firms to other members of the their family.

With regard to the size of the companies and its association with particular constraints, very few significant correlations were obtained. The smaller companies were associated with problems involving the seasonal fluctuations, whilst the intermediate-sized companies indicated that the uncertainty over federal government policy was always a problem.

For the Prairies as a whole, some definite relationships between the type of industry and the constraints encountered were established. The complaints over the high cost of land were associated with the firms in the plastics sector and the problem involving the uncertainty over government policy was significant for the firms in the oil and gas equipment production firms; the agricultural implement manufacturers faced a lack of financial resources in the past. The agricultural implement producers in the Regina/Saskatoon group also encountered product problems in the past. The farm implement producers of the regional centres complained about a lack of a particular type of labour, namely, welders.

As a final comment on the constraints to growth, the respondents were queried on the actions which they would undertake if the problems should persist to the extent that they would have trouble solving the problems. The idea of selling the company was not too remote an option for the majority of the companies to consider (Table 92). Some were vague about their possible actions and simply demonstrated fortitude with the typical reply- 'carry on as best as possible'. However, relocation especially to the United States was favoured by almost 20% of the respondents.

A note on the response to possible relocation as a result of constraints on growth in existing locations

The attraction of Prairie firms to certain United States locations is influenced not only by the industrial incentives offered, but also by the nature of the business climate. The latter factor was perceived as being favourable by the surveyed firms. However, the respondents were not questioned deeply either on their perception of the American business climate or on the nature of incentives. Some independent findings were obtained, in order to give insights into the attraction of respondents to United States locations.

In a relatively recent study of business climates in the United States, most of the northern states bordering on the Canadian Prairie provinces were reported to be favourably perceived (Industrial Development, 1980). The states were ranked on the basis of their scores on business climate, as measured by such factors as, labour union membership as a percent of total labour, state and local taxes per capita, and state spending per capita. A total of 18 factors were used to express the 'climate', which was subsequently defined as "the aspect of business environment directly controlled by the actions of the state governments".

The surveyed firms for the present study made some references to the incentives offered by certain states. But, most of the respondent firms, which do not already have branches in the States, were rather vague about the incentives available. Those with U.S. branches made specific references to the tax incentives offered. The northern states offer many of the most sought after incentives - namely those that involve tax exemptions. As already indicated in the discussion on government programmes Prairie firms received very little financial assistance from their local municipal governments. But, in the U.S., the municipalities devote a great deal of effort, especially in the form of loans, to the attraction of manufacturing firms.

In addition to the state incentives, an attempt was made to obtain some information on the current incentives offered by the U.S. Federal Government. In a recent study by the OECD (1979), the regional incentives offered by the number of countries were evaluated. A summary of their results is presented in Table 93. The forms of aid offered by the two governments differ, except for loans. The attraction of Prairie firms to American locations is aided by the incentives, the flexibility with which the incentives are administered, and the overall business climate conducive to manufacturing.

H. A Model of Firm Behaviour at Different Development Phases in a Peripheral Location

In view of the detailed empirical investigation presented above of the factors associated with firm behaviour in a peripheral location, to simplify the conclusions, it is necessary to isolate the significant factors connected with each development phase. The isolation of such significant factors is designed to facilitate the development of 'ideal' growth patterns (spatially and non-spatially) of each of the four development phases, that is, young firm (mature product), young firm (old product), mature firm (mature product), and mature firm (old product) identified earlier. Unlike Hakanson's (1979) development of corporate growth patterns, the growth patterns represented in this study are based on development phases rather than on the stage of development of firms. The proportion of different development phases in the prairies is shown in Map 4. This visual representation gives a vivid impression that the regional centres are characterized by young firms with old products, while the metropolitan centres are typified by young firms with mature products. In addition, the growth patterns of the firms in this study are presented in a series of graphical representations (Figures 5 to 8), based on three geographical levels with six sub-levels:

1. Core area - founding area
    (i) City (centre)
    (ii) Province or State

2. National
    (i)Regional
    (ii) Country
3. International
    (i)Favourably trade relations
    (ii) Unfavourable trade relations

Young firms/Mature Products - Figure 3:

This development phase consists of young firms that have been in business for eighteen years or less. Their products are mature in that they have been on the market for between twenty and thirty years. The phase is likely to be found mostly in the metropolitan centres of the Prairie region. In a relative sense, it is the most youthful classification of all the development phases, at least in a peripheral location.

Most of the entrepreneurs are likely to have a previous manufacturing experience. They would have worked previously for firms in the same line of business activities, particularly in plastics fabricating in the Prairie case. Their main goal is to stay ahead of competition. As a result, they are more likely to adopt three or more growth strategies. Even for the young firms, it is not surprising to find them associated with six strategies but this is, however, only true for metropolitan firms. In the metropolitan centres, the entrepreneurs are likely to combine vertical and geographical diversifications with the creation of divisions, or merger, or new companies, or branch plants. The regional firms may also establish branch plants. Entrepreneurs in both levels of centres are likely to start their manufacturing endeavours with the initial distribution of other manufacturers' products. Whilst their ties with the local region are strong (especially for the regional firms in this phase), they are likely to become involved in the export market. The metropolitan firms also concentrate on the regional market.

Their growth strategies have significant spatial implications. The reasons for their decisions to expand on the same site reflect their ties with the local market but, both the small and the large firms are prompted to relocate in order to take advantage of a new market and an improved environment. The latter factor implies an inadequate space in the previous location. As an observation of all frims, the medium-sized ones are likely to establish branch plants so as to take advantage of untapped markets and proximity of suppliers and customers.

Despite the adoption of many strategies, this development phase is rather specialized in that only two or three lines of products are manufactured and the size of the majority of companies is small. The firms are also rather stable, remaining in the same industrial sector for a number of years. But, in doing so they are likely to experience wide fluctuations in their growth when measured by employment.

The generation of innovation is a major part of their activities. In the metropolitan centres, innovation which make noticeable changes on current technology are often the results of their R & D activities. They have R & D sections and rely on their employees and customers to generate the inventions which are subsequently patented and developed. Although, they still spend less on R & D when compared to young firms located in the central regions of the country(MOSST 1979), they are more likely to allocate a budget for R & D than firms in the other development phases. The regional firms can also be credited with the generation of innovation although the types of innovation generated make little or no change to current technology.

In trying to fulfill their strategies, including innovation, they are likely to rely on government incentives. Often they find government assistance to be insufficient. In addition to insufficient funding, they may experience a lack of managerial resources. Other costs of production such as labour and land are likely to hinder their growth possibilities. In view of these problems, and the fact that they are young and enterprising, they will readily relocate to countries of favourable business climate.

Young Firms/Old Products - Figure 6:

This is a phase that is characteristic of firms in regional centres. The firms are young (established for eighteen years or less), but their products are old. The products have been on the market for over forty years. They are strongly tied to the rural areas because they are mainly manufacturing products destined for the farms. They are not strongly attached to any particular goal, except in the metropolitan centres, where profit maximization is paramount. Vertical and geographical diversification, in addition to the distribution of other manufacturers' products, are the main strategies. Whilst the metropolitan firms remain tied to the local market, the regional firms concentrate on the regional market. They are likely to show the least interest in the export market. Although conglomerate diversification is significantly associated with this phase, the firms are still more likely to remain in the same industrial sectors. Like the young firms (mature products), the firms belonging to this phase are small with about three product lines, but not necessarily in the same industrial sector.

They consider innovation to be crucial, although they are less likely to participate in the innovation process vigorously. But, they can generate one innovation, which may cause slight changes to current technology. Their lack of innovative activities is reflected in the problems they encounter in trying to survive. They are more likely to be inhibited by technological obsolescence and product problems. These cause a low market demand. As a result they find borrowing from banks to be exceptionally difficult. Since they are tied to the rural market, they find seasonal fluctuations to be problematic even though they have conglomerate diversification as one of their strategies. Other costs of production that limit their growth prospects are the cost of land, lack of capital equipment, and skilled labour. Their proposed solution to the problem is likely to rest on decisions involving expansion into other fields (manufacturing and non-manufacturing). Seasonal or capacity constraints to growth were not evident in the responses giving reasons for diversification.

Mature Firm/Mature Product - Figure 7

This is a development phase of firms that typifies the metropolitan centres. The firms have been established for over twenty years and they are manufacturing products that have been on the market for between twenty and thirty years. Their initial location decisions are based on personal reasons, which mean that the entrepreneurs had lived and worked in the area previously. Profit maximization is the dominant objective. In other to fulfill it, the entrepreneurs are likely to adopt numerous strategies (at least six), with a major emphasis on vertical diversification.

Their investment decisions are reflected in their location decisions on relocation, branch plants, and expansion in situ. The medium-sized firms, in particular, are likely to relocate not only because the new buildings are more efficient but also to take advantage of government incentives. Functional delineation is a major aspect of their strategies, because branch plants are established (by metropolitan firms) to produce designated products. The large firms are more likely to establish branch plants in order to take advantage of the presence of large pools of unskilled labour and government incentives. Although they are not likely to be linked with one particular market, they consider expansion in situ as a necessity for the maintenance of local and established customers.

In addition to the numerous growth strategies, innovation is considered to be a necessity. They take more patents out, but often only minor innovations are the result. The regional firms may generate more significant innovations. The firms in this development phase are likely to use government, not so much for their innovative activities but more for their production process.

Since the firms in this category tend to be medium to large in size and diversified, they find the domestic market to be too small and fragmented leading to high transportation costs. They are not associated with any action to be undertaken to rectify their growth problems, which are few compared to the other development phases.

Mature Firm/Old Product - Figure 8

This development phase consists of firms that have been established for over twenty years but manufacture products that have been on the market for over forty years. It is a phase that is commonly found in the regional centres but also has a significant presence in the metropolitan centres. The entrepreneurs are attracted to regional locations because of the availability of resources, government incentives and a certain amount of professional services. Their main objective is to develop the company, especially in the metropolitan centres. Modernization and distribution are major growth strategies. The large firms in the metropolitan centres are likely to be engaged more in acquisition as a means of solving slow growth. They also adopt the acquisition strategy to maintain their market share. The regional firms are more likely to consider relocation which is often precipitated by managerial enthusiasm. In general, they do not necessarily remain tied to their local areas because they tend to prefer the regional market. Also, they tend to remain in the same industrial sector, even though they (the metropolitan firms in particular) are likely to experience wide employment fluctuations.

Innovation is not a particularly strong strategy for them. Some R & D is considered essential and they tend to make it part of their general marketing policy, that is, as part of sales strategy. They are more likely to generate more unpatented innovations and rely more on licenses.

Unlike the young firms with old products, they are not besieged by product problems but more by a lack of management control systems and financial resources to integrate their activities. Labour competition with major projects which pay higher wages is often a hindrance to the maintenance of loyal employees. This group is likely to place the cause of their problems in government interference, but the members of the group may expand into other fields in manufacturing.

VI. SUMMARY, CONCLUSIONS AND IMPLICATIONS

This section serves to reiterate the findings and to state the conclusions of this research. The implications of the study are also set out.

A. Summary of the Analysis

On the basis of the analysis of interview data from 197 Prairie manufacturing firms, it is possible to offer some generalized inferences about the decisions made at the various phases of firm development and the subsequent spatial patterns resulting from these decisions. It is also possible to generalize about the behaviour of Prairie manufacturing firms regardless of their development phases.

Initial Location Factors

The majority of the surveyed firms were incorporated after the Second World War and their founders invariably located in the areas where they lived and worked. Varying reasons were offered for the intial location decisions, but the personal (and/or chance) factor proved to be dominant. The personal aspect includes not only the residency of the founder but also the desire for self-employment. Very few of the firms were established to produce inventions, the emphasis on the commercial applications of their inventions becoming prominent after the firms were already in existence. The majority of the patented innovations are held by firms that belong to the farm implement industry and sectors in the metal fabricating and machinery industries. A very large number of firms belonging to all the industries are characterized by multiproduct lines. The implication of this characteristic will be pursued in relation to the growth strategies.

The firm development phase and the product life cycle are interrelated because the former is a derivation from the latter as well as the age of the firm. In the Prairie context, firms have been created at various stages of the product life cycle. Although most of the interviewed firms are young to mature in terms of the age of their operations, the products of the firms are in the mature to old age stages of their development. Very few firms are producing items that came on the market during the last decade. When the firms are considered on the basis of their age only, there is hardly any difference between the metropolitan and the regional centres. The main difference becomes apparent when the product age structure is considered in conjunction with firm age structure. In this case, the metropolitan centres are characterized more by young firms with mature products. The regional centres are typified by young firms with old products. For the Prairies as a whole the two most common categories are young firm/mature product and mature firm/mature product.

Scale Factors

A number of criteria were used to measure the growth or scale variables (employment, wages and salaries paid, and the total value of shipments). Two relatively recent time periods were chosen to indicate scale changes of firms in their development phases. The major relationship between the scale variables and age is largely that of a positive association, that is, young firms (age of operations) and small size; and mature firm (age of operations) and large size. The major relationships between the age of the firm (based on the age of the products and the date of firm establishment) and the scale variables are: Young firm/mature product and small size; and mature firm/mature product and large size. The secondary metropolitan centres and the regional centres both contained a higher number of small firms during the period examined. An increase in the size of the firms (changes in the size categories) could be discerned between 1969 and 1979. The increase was also marked by variable growth rates. The regional centres and the secondary metropolitan centres experienced very rapid changes in their employment. Most of the firms in this category belong to the young firm/old product development phase. The metropolitan centre firms also experienced marked fluctuations in their employment growth. The experience was felt mainly by the young firms with mature product category in the plastics sector. Nearly all the firms, regardless of the development phase, experienced very marked decrease in employment growth between 1968 and 1973, the middle period as defined in the time series analysis performed on the industry data.

Growth Strategies

In order to reach the various levels of growth (as indicated by the different scale variables), the interviewed firms have adopted numerous strategies. In addition, the strategies have been chosen to allow the owners and managers to fulfill certain goals. The goals are multi-dimensional and are centred on the provision of good product or service, the maximization of profit, and the pursuance of growth and development.

In terms of the means of fulfilling the goals, the following growth strategies (in order of the total responses obtained on each strategy) were indicated by the surveyed firms:

1. internal diversification into related products
2. internal diversification into different markets
3. internal diversification into unrelated products
4. modernization
5. creation of divisions within the firm
6. establishment of branch plants
7. mergers and acquisitions
8. distribution of other manufacturers' products initially
9. creation of new company (including joint ventures)
10. distribution of other manufacturers' products is still part of the activities of the firm.

The most common strategies are the three internal diversification measures (1-3) which have been achieved at one location.

These investment decisions have a spatial orientation. The spatial aspect is well illustrated by the market diversification (internal diversification carried out from the main or original location of the firms), the establishment of branch plants, the creation of divisions, and the internal diversification into related and unrelated products. The last two measures are basically responsible for the decisions to expand on existing premises. The Prairie manufacturing firms have also shown a preference for the regional market, that is, western Canada. The most frequently made decision was on relocation. The relocation decisions were mainly intra-city and intra-province. The decision to expand in situ was a close second. Both the relocation and the expansion in situ decisions reflect the strategies of the three internal diversification measures. The firms attached varying degrees of importance to the factors underlying each of the location decisions. On relocation, the greatest emphases were placed on the efficiency of new buildings and the consolidation of activities at one location.

The need for a quick entry (through merger and acquisition) into another market in order to fulfill the goal of diversification was cited and ranked highly by most of the respondents. Nearly all the factors underlying expansion in situ were ranked highly by most of the respondents.

Innovation

A large firm size is often advocated because large size is more conducive to innovative activity. This is not the case in the Prairies. Inventive and innovative activities have been generated by small, medium and large firms. However, large scale R & D projects are few in number. Also, Prairie firms consider R & D to be mainly product development or modification. Most of the Prairie firms commenced their innovative activities after 1976. There was a time lag of between five to ten years from the establishment date to when innovation commenced. A high proportion of regional firms depended on parents for innovation. They relied more on machinery designed and manufactured in-house. Most of the innovations caused little or no significant changes in their current technology.

Government Programmes

For the purpose of this study, the degree of success of government programmes in promoting the growth of the interviewed firms can only be concluded in qualitative terms. Firstly, on the basis of the various criteria used in evaluating the government programmes, the firms responded favourably to nearly all of them, except for the speed to process an application.

Secondly, the majority of the firms (young with mature products) admitted that the programmes did influence their production process, innovation policies, and their labour requirements. The effect of government assistance on innovation policies was particularly significant for the mature firms (old products) assisted by DREE under the RDIA programme. The DREE firms not only commenced their innovative activities later than the rest of the firms (including the unassisted firms) but also relied more on government assistance for the generation of their new products. However, the positive effect of the new employment generated by the innovative activities must not be exaggerated, since the new products are not the type which require a labour intensive production function with a high proportion of scientific and engineering inputs as advocated by Thomas (1974). On the basis of the suggested classification of innovation, both government assisted and non-assisted firms have produced innovations which made only minor changes to current technology.

With regard to the influence of government programmes in attracting industry to Prairie locations (especially to the regional centres), this influence is almost negligible, except for Moose Jaw, where respondents (mature firms with mature products) stated that the provincial programmes were the deciding factor in the decision of the firms to locate there.

Constraints

In implementing their growth strategies, including innovation, Prairie firms have encountered numerous problems. Many of the problems cited involved the labour market, the high transport costs, the uncertainty over government policy,and the high cost of imported materials. Definite relationships between the type of industry and specific problems were established. The uncertainty over government policy was significant for the oil and gas equipment manufacturers. The high cost of land was a very significant cost among the other costs of production for the plastics fabricating sector.

B. Questions and Hypotheses

Questions

Throughout the discussion on the theories of the firm, the review of literature, and the proposed approach to the study to the development of firms, several questions were raised. Attempts have already been made to answer these questions along with the major hypotheses in the data analysis section. However, summaries of the answers to the questions and the hypotheses are provided below.

Distribution of development phases

> What is the distribution of young, mature, and old firms between industries and types and sizes of centres?

There is enough evidence from this empirical investigation to show that there is indeed a difference between metropolitan and regional centres. The major metropolitan centres are characterized by young firms with mature products and the regional centres are typified by young firms with old products. This finding lends support, on the basis of statistical associations, for the filtering-down hypothesis that peripheral regions (in this case, the three Canadian prairie provinces) are characterized by firms with mature products. Some support is also given to the centre and periphery mechanism within the region, that is, the metropolitan centres within the Prairies have firms that are producing relatively younger products, whereas the regional centres (which comprise the periphery) are typified by firms producing old products many of which are branch plants of prairie metropolitan firms.

Plant location decision

> At what phase in the firm's development do plant location decisions become a significant factor or when do they identify in turn a new phase of the development?

Location decisions could be important at any phase, but the firms in a development phase characterized by mature firms with mature products, are more likely to make decisions on relocation, branch plants, acquisition and merger for reasons based on the availability of government incentives and the presence of a pool of labour.

Firm size and the generation of innovation, new firms and firm expansion

> To what extent do small firms vis-a-vis large ones in the regional context, propagate innovation, new firms and firm expansion?

Significant relationships were established for new firms, innovation and firm size. To avoid repetition, the relationship between firm size and innovation is discussed in conjunction with the other questions on innovation. In general, large firms are more likely to propagate new firms, at least in terms of the establishment of branch plants. Some support is also given to the centre and periphery mechanism within the region, that is, the metropolitan centres within the Prairies have firms that are producing relatively younger products, whereas the regional centres (which comprise the periphery) are typified by firms producing old products.

Innovation and Development Phases

> Does innovation occur more often in firms in particular ages, sizes, industries of particular locations?

The mature firms with mature products were associated with a higher degree of patenting. In terms of the commercial application of the patented inventions, the young firms with mature products (metropolitan centres) were more likely to be involved. The commercial applications were associated with the mature firms with mature products in the regional centres. The mature firms with old products (metropolitan centres) and the young firms with mature products (regional centres) were responsible for innovations that caused little or no significant changes in current technology. The inventions leading to the innovations originated with both the employees and customers of the young firms (mature products). Firms in this development phase had R & D activities which were often combined with other departments and they have undertaken some R & D in the last five years. Firms in this phase also viewed innovation as being a necessity but not crucial for survival in the major metropolitan centres. However, young firms with old products considered innovation to be crucial for their survival, especially in the secondary metropolitan centres of Regina and Saskatoon. The generation of one innovation was associated with the young firms with mature products in the plastics, prefabricated buildings, farm implement, and oil and gas production equipment. Unpatented innovations were associated with the old firms in the metropolitan centres. The generation of more than six innovations was associated with the young firms with mature products. Firms in this phase also tended to be involved in the production of many lines, that is, over eight product lines. In addition, they had a large number of growth strategies (more than four). Licensing agreements with United States firms were linked with mature firms with old products in the metropolitan centres.

There were a number of associations between size and innovations. Both the small and the large firms were linked with at least one patented innovation. The small firms with one innovation belonged to the farm implement and metal fabricating industries in the metropolitan centres. They were producing mainly old products. The medium and large firms were associated with one and over six innovations and their products tended to be young to mature. They also spent more on R & D. It could be argued that large firm sizes will lead to 'bigger' innovations (that is, innovations that change the course of history) rather than the 'little' innovations (that is, those which make no drastic changes to current technology) generated by Prairie firms. The Prairie firms interested in innovation recognize the need to be larger, not only for qualifying for government grants, but also for being able to devote more time to research and development. In general, a large firm size does not seem to be a pre-requisite,however, for participation in the innovative and especially, in the inventive process by Prairie firms. In addition, licensing and the transfer of technology through foreign owned branch plants, are increasingly upgrading Prairie innovation. However, this last assertion is debatable. The branch plants relied more on their parents located outside of Canada for innovation. They do receive the results of the innovative activities of their parents, but only when the products and processes have become standardized. However, the respondents did not indicate the length of time it took for the new products to be transferred to the branches.

Hypotheses

HO 1: There are significant differences in the initial location factors of firms in various development phases in different levels of centres.

This hypothesis can be accepted on the basis of the following statistically significant associations between age phases and certain location factors. Mature firms (mature products) in the metropolitan centres ranked the personal factor higher than firms in any other development phase. Mature firms (old products) in the regional centres rated the availability of resources higher than firms in any other development phase. Government incentives also proved to be influential on the location decisions of mature firms with old products, especially in the regional centres and Winnipeg. The hypothesis can be accepted, therefore, on the basis of the evidence presented above.

HO 2: There are significant differences in the goals and growth strategies (including innovation) of firms at different development phases in different levels of centres.

Some differences do exist between the development phases in the different levels of centres on goals and strategies. On the basis of the development phases, the young firms (mature products) in the metropolitan centres indicated high rankings on the desire to stay ahead of competition and on the profit maximization motive. The last motive was particularly associated with the Alberta metropolitan centres. The young firms with old products in the Alberta and Manitoba metropolitan centres also ranked the profit maximization motive very highly. Those firms (young firm/mature product) associated with the provision of good product as a major motive were also associated with the adoption of one to three strategies. The firms with a major emphasis on the profit maximization motive were associated with the adoption of five strategies. The adoption of six strategies was prompted by the firms that concentrated on the survival motive.

With regard to the development phases and the strategies, the older companies have adopted not only the three internal diversification measures, but they have also established branch plants, created new companies (unrelated to the branch plants), created divisions within the main firms, and instituted a modernization policy. Therefore, on this evidence, the hypothesis may be accepted.

HO 3: There are significant differences between firms in various development phases and the type of location decisions made (other than the initial location decision)

Age and size have influenced location decisions. In searching for new buildings, the mature firms with mature products placed a high degree of importance on the efficiency of the building, the availability of government incentives (especially the Saskatchewan firms), and the need to have managerial enthusiasm (mainly Alberta firms). Young firms with mature products in Alberta also emphasized the presence of a new market and the improved environment. Relocation on the basis of cost proved to be very important for both the small and the large firms. Small firms were influenced to relocate because of lower rents. Large firms relocated as a result of the sale of the building in which they leased space.

The proximity to distributors and customers as an influence on the location of branch plant, was considered to be highly important by the majority of the respondents. It was significant for the young firms with mature products. The mature firms with mature products established branch plants for the main purpose of having the plants produce designated products. Size was also an important variable of location decisions involving the establishment of branch plants. The small firms were prompted by the presence of an untapped market and the large firms were influenced by the availability of government incentives as well as the availability of unskilled labour. The latter factor is particularly significant for the support of the filtering down hypothesis. However, the need to solve a slow growth problem was significantly associated with mature firms with old products. This provides support for the view that the most common strategy of mature firms, especially with old products, is acquisition. This is due to the fact that during the mature phase of a firm and its products, the profitability of high yielding projects is reduced because of the entrance of more firms into the industry. In order for the firm to maintain its profitability, its decision-makers must invest in other areas (or find other avenues of investment). Size also proved to be an important factor in location decision based on merger and acquisition. Large firms sought to merge with or acquire another company in order to maintain market share, whereas the small firms undertook the merger decisions because of the availability of government incentives. The mature firms with old products in the metropolitan centres expanded on their existing premises so as to maintain contacts with customers and distributors. The young firms with mature products were prompted by the same factor. The hypothesis can be accepted, therefore, on the basis of the above evidence.

HO 4: There is a significant relationship between the type of growth constraint experienced in metropolitan and regional locations and the development phase of a firm.

The young firms with mature products faced the continuous problem of lack of skilled labour, the lack of access to management resources in the past and in the present, and the high labour costs. Firms in the same development phase expressed the desire to relocate to the United States. Both the young and mature firms with old products would expand into other fields. In terms of constraints to growth, the mature firms with old products had significant statistical associations with high transport costs and government interference. All the problems mentioned so far were encountered by metropolitan firms. Firms in the development phase of young firms with old products in the regional centres lacked borrowing power, and were hindered by low market growth, high cost of land and techonological obsolescence. The hypothesis can be accepted, therefore, on the basis of the above evidence presented.

C. Implications and Recommendations

Although the major implications of this study are directed toward the government, there are a number of implications for the private sector as well. The study suggests to management of firms possible responses not only to problems in different development phases, but also to technological, locational and investment characteristics of firms in these phases. The study also indicates possible growth strategy combinations. The findings of this study provide only indicators to entrepreneurs in their decision-making. The results cannot be used for systematic business planning because they do not describe how the future operating environments of firms may unfold as a firm moves from one phase to another and what the implications are for their strategies and plans. The identified development phases could be used as a pervasive variable in formulating industrial development decisions by government. A major finding of this study is that young firms with young products as identified in the study are not attracted to the regional centres within a peripheral region. In fact, the regional centres have a proportionately higher number of branch operations and firms with old products than the metropolitan centres. The young firms (old products) due to entrepreneurial conscious or unconscious decisions, tend to remain small and unimaginative.

(1) Therefore, it is recommended that government assistance could be used to attract firms in the early stages of the product cycle to regional centres. It is recommended that firms producing in the early stages of the product cycle in the following industries, oil and gas production equipment, plastics, transportation equipment, and the specialized sectors of the agriculture implements, should be encouraged to become established in such locations. These are the growth industries of the prairies which have a high degree of patenting activity.

(2) It is recommended that the policy of offering a general blanket incentive to all manufacturing be discouraged. It is well known that there are industries which the prairies cannot hope to be competitive. If blanket incentives are offered to incorporate firms in such industries, the long run costs of developing such industries may outweigh the benefits.

For the Prairie regional centres, the suggested industries could be designated as infant industries comprised of young firms producing young products. As a result of this classification, special incentives could then be directed to them. The incentives must be tailored to suit the size of the companies. A fund should be provided for immediate risk-finance. This is a necessity for firms producing in the early stages of the product cycle. Further facilities are needed for market research of the new products. There is a definite gap between invention and commercialization of the inventions on the Prairies. This is partially evident by the fact that only about 10% of inventions on the prairies are actually assigned to incorporated companies (Patent Office Records, 1969 to 1979). Since this study did not seek information from individual inventors, it can only be speculated that many inventions and innovations have remained undeveloped or have become commercial failures because of a lack of finance as well as a means of successful marketing.

(3) Although the interviewed firms were not asked to compare manufacturing incentives programmes offered by both the provincial and the federal governments with those offered in the United States, nevertheless, a significant number of firms did allude to the attractiveness of the assistance offered by the neighbouring States. The flexibility and the climate surrounding the U.S. programmes were seen by the respondent firms to be particularly attractive. The level of assistance offered by, for example, DREE, would not only have to be increased, but a follow-up assistance programme (to the initial assistance) must also be implemented to increase the number of applicants to DREE. In addition, more effort should be made to change the adverse image by increased but aggressive advertising, which should stress any advantages Canadian programmes may have over those offered in the United States. The observations of this study imply that unassisted firms can be attracted into the assisted camp, especially if the ignorance of the former

group can be eliminated. The promotion of government industrial incentive programmes may even be carried out by the chartered banks. The incentive of generating profits from potential borrowers may encourage the banks to lend support for the programmes.

(4) In view of the fact that a significant number of the firms interviewed mentioned that uncertainties over government policy hindered their development, it is recommended that actions which create uncertainties must be avoided. Policies that indicate a long term commitment to an area must be encouraged. Too many department restructurings create uncertainties. These should be lessened.

(5) Since large firms were significantly associated with the usage of the government programmes, such as those conducted by DREE, it is mandatory that more effort should be devoted to attracting small firms by designing programmes appropriate to their needs and ability to use them. It is the small firms which more usually require assistance.

(6) In view of the fact that most repeat users of government programmes were the firms assisted under the DREE (RDIA) program, it is recommended that periodic contacts after the final payment should be established with all the users. Also, a method of post-award auditing should be devised and implemented, so as to monitor the assisted firms' progress. If problems were identified then further assistance or advice could be offered to aid the firm's viability.

(7) One of the major complaints often cited about Canadian manufacturers is that they are too diversified (Royal Commission on Corporate Concentration, 1978). This excessive diversification has been acknowledged as a hindrance to the efficiency of resource allocation and the major solution often suggested is that the size of firms (not the plants associated with the firms) should be increased. Another solution which has been voiced is that the product lines within the plants belonging to the firms should be rationalized. Whilst these solutions may be feasible for large to medium-sized firms located in Central Canada, the success of such solutions in the Prairies is for the present and probably in the near future, doubtful. Prairie firms, with perhaps the exception of medium-sized firms, are strongly committed to diversification as a means of survival. The medium sized firms have shown a significant preference for mergers and acquisitions. This preference may well increase the level of the size of firms as advocated by the Royal Commission on Corporate Concentration. Within the prairie context, diversification should not be discouraged but it is necessary to strengthen the emphasis on longer production runs through exporting.

(8) With regard to the number of product lines, the trend, as already mentioned, is the opposite of rationalization. From the formative period of the Prairie firms, one of the strongest goals of the entrepreneurs (owners and managers) is that of multiproduct development so

as to reduce risks, market uncertainty and dependence on any one product. The interviewed firms did recognize the need to rationalize their product lines but only if they were faced with short term problems, such as the lack of finance, skilled labour shortages, and the lack of plant and equipment. Prairie manufacturers, at least those that belong to the major industries (farm implement, plastics, and oil field production equipment) interviewed for this study, support the production of many lines because of the volatile nature of their industries. Most firms have short production lines and are characterized more by custom product manufacturing.

If it is accepted that rationalization of the product lines and the securing of major export markets lead to a realization of economies of large scale production, then perhaps the policies of funding new product lines (such as those administered by DREE) should be reviewed, so as to discourage the production of many lines.

(9) Accepting that diversification is necessary for survival because of the narrow base of manufacturing on the Prairies, it is recommended, nevertheless, that the medium to large firms should be encouraged to specialize judiciously. This encouragement can be provided through a stricter scrutiny of the assistance given to firms for the addition of new product lines. More emphasis should be placed on the generalization of new product lines in newer and dynamic sectors of the suggested industries than on old,

static industries. In order to increase the size of the firms on the Prairies so as to ensure an efficient allocation of resources, assistance should be given to medium-sized firms contemplating mergers and acquisitions of related but dynamic firms. They were the firms interested in such growth strategies.

(10) In view of the fact that the majority of the innovations encountered in this study are market-oriented, therefore, it is recommended that adaptive R & D deserves more attention than it has been accorded by the Department of Industry, Trade and Commerce through its Enterprise Development Program. This attention may be provided by a greater promotion of patents that are available for licensing, and the institution of a special sub-program to assist in the development of the products under license. Through this program a potential licensee should be promoted and aided in establishing in-house R & D. Effective licensing agreements should lead to an effective in-house R & D.

D. Theoretical Considerations and Suggestions for Future Research

Evidence gathered in this study clearly supports a number of the propositions discussed within the context of the various appproaches to firm behaviour. In particular, it has been shown that in the prairies, a peripheral location, they are firms which produce mature products, a characteristic suggested by Thompson of peripheral locations. However, some findings on the location decisions of the firms contradict previous results. In addition, this investigation has highlighted some considerations on the universality of the findings which could be the subject of another study. The support for the propositions is based primarily on the statistical associations which are significant, but which are often weakly correlated. Therefore, the findings may be relevant to the prairies only and may not be universally true for all peripheral locations or for the prairies in a different time period.

In addition, some findings for the respondent prairie firms do not support previous results. The findings involve transportation cost, cost of raw materials, and proximity to raw materials. These factors have an insignificant impact on location decisions for these firms. In fact, they are incidental factors. They may still remain significant location factors for firms in other industries in other regions. They may be, also, as found in the case of transportation costs for prairie firms, problems which face firm growth subsequent to location. These factors may also be the main reason why some firms have not located in the prairies. In such cases these location factors would not be incidental.

In this investigation an attempt has been made to contribute to the articulation of empirical frameworks which provide a greater measure of understanding of firm behaviour. But, this investigation does not fit neatly into any of the industrial location approaches advanced so far. Some research has been undertaken to trace the changes and to review recent progress in industrial location analysis.

In the late 1970s, a working group of the British Social Science Research Council (SSRC; P. Wood,1978) isolated six types of industrial location analysis. These include industrial movement and location choice, industrial linkage patterns and regional impact, aggregate industrial employment patterns and change, communication and information flows, location behaviour of different types of firm, and theory. Within this classification, the present analysis of firm behaviour falls within the category of 'location behaviour of different types of firms' and partially within that of studies classified as 'industrial movement and location choice'. While the emphasis of the studies on location behaviour of different firms has been on multi-plant firms and small to medium-sized firms, the focus of this study has been on location and investment decisions associated with firms within different development phases (age of product/age of firm) regardless of firm size.

This study has demonstrated that it is possible to analyze spatial aspects of industrial firms in association with another dimension, that is, the time dimension. In particular, by using the taxonomic approach, based on firm age and product age, to examine the firm's characteristics such as location and growth strategy behaviour, it has been possible to demonstrate that firms differ in their development phases, with association behaviour between different levels of centres. This has pragmatic implications for the industrial development policies of the administrations of these centres as well as for regional development policies of the provincial and federal governments. One other contribution of this study relates to the application of the concept of life cycle. Although life cycle can be appropriately applied to a product in most cases, it cannot be easily applied to a firm because a firm can become rejuvenated at an old age by new products. However, using the taxonomy developed in this study, life cycle can be accommodated because no death of firm is implied. The present taxonomy is growth and development oriented.

Another attempt to trace the changes in industrial geographic analysis was recently presented in an edited book by Rees et. al., (1981). In it two major conceptual shifts can be detected relating to the concept of location analysis itself and in the conceptualization of location analysis within a regional systems framework. This delineation gives the impression that a holistic approach is evolving. A closer examination of the collection of essays shows that, on the contrary, there are still many diverse approaches to industrial location. Many of the approaches are not oriented toward a regional systems framework. In fact, six types of studies with different approaches are identifiable: firm level, linkage diffusion, production factors, environmental and Marxist. Undeniably, these approaches are not althogether mutually exclusive. The present study encompasses some of the approaches mentioned above, namely, the firm level, production factors and environmental. The success of this study, as well as its limitations, suggest potential for further improvements in the methods employed, many of which would still rely on unpublished data.

The ideas and methods of this study were developed using data collected from "growth" industries located in a peripheral region, that is, the Prairies. One possible extension, short of all manufacturing industries, would be to examine declining and stable industries using the development phase approach. The results could then be compared with the results of this study. Another extension would be to concentrate on public companies. Since data on R & D expenditures, sales, profits, earnings per share, controlling interests, patents, subsidiaries, branches, and ownership can be obtained without too much difficulty, the effects of innovation on the development of public companies explored. The effects of each innovation on growth would have to be isolated. Also, the rate of growth of innovative firms could be compared with the rate of growth of the rest of the industry. A problem involving too few firms may be encountered because there are not too many public companies that belong to just one industry in the prairies.

The development phase approach as developed in this study needs further refinements. The age of the firm and the age of its products formed the basis of this analysis. Other variables could be substituted, provided that the relevant data are available. Size (based on employment or sales) could be substituted for product. A rule would have to be established as to what the size of a firm should be at a particular phase. As a consequence of differences in labour quality, productivity and the automation potential with respect to the product concerned, employment size may be a difficult variable to substitute for product age.

Finally, data refinements would include the adoption of simplified questionnaire and interview questions. The responses to the survey should be subjected to a content analysis whereby a concensus of opinion on the interpretation of the replies would be necessary. Although every effort was made to ensure that the reliability of the data collected for this research and a consistent interpretation of the questions was adhered to by the writer, these aspects could have been enhanced by content analysis. It is suggested that future analysis of peripheral firms take into account the development approach as demonstrated in this research, with the improvements, and extensions to macro-economic conditions discusssed above.

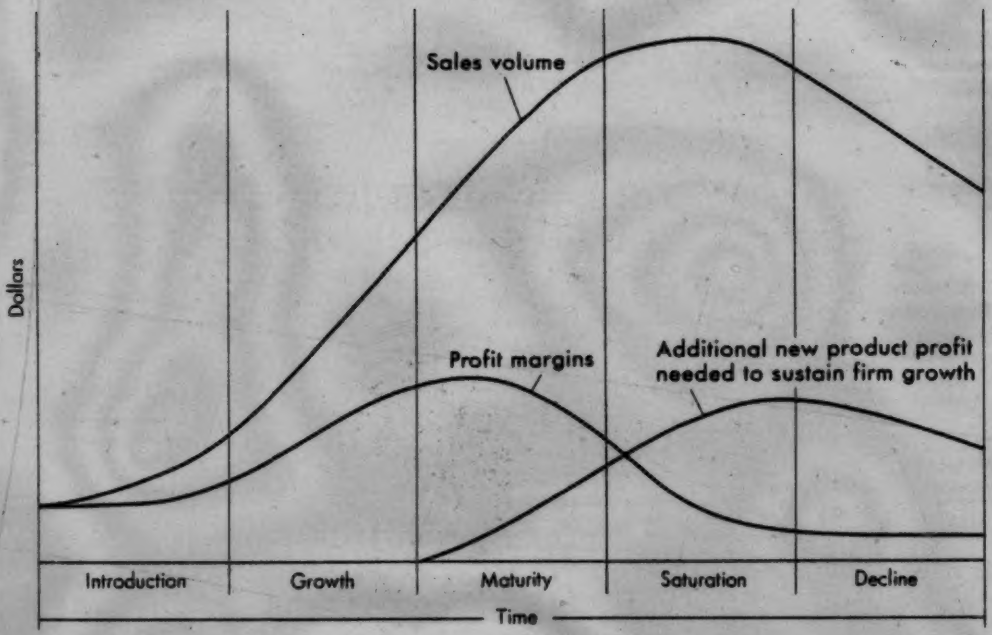
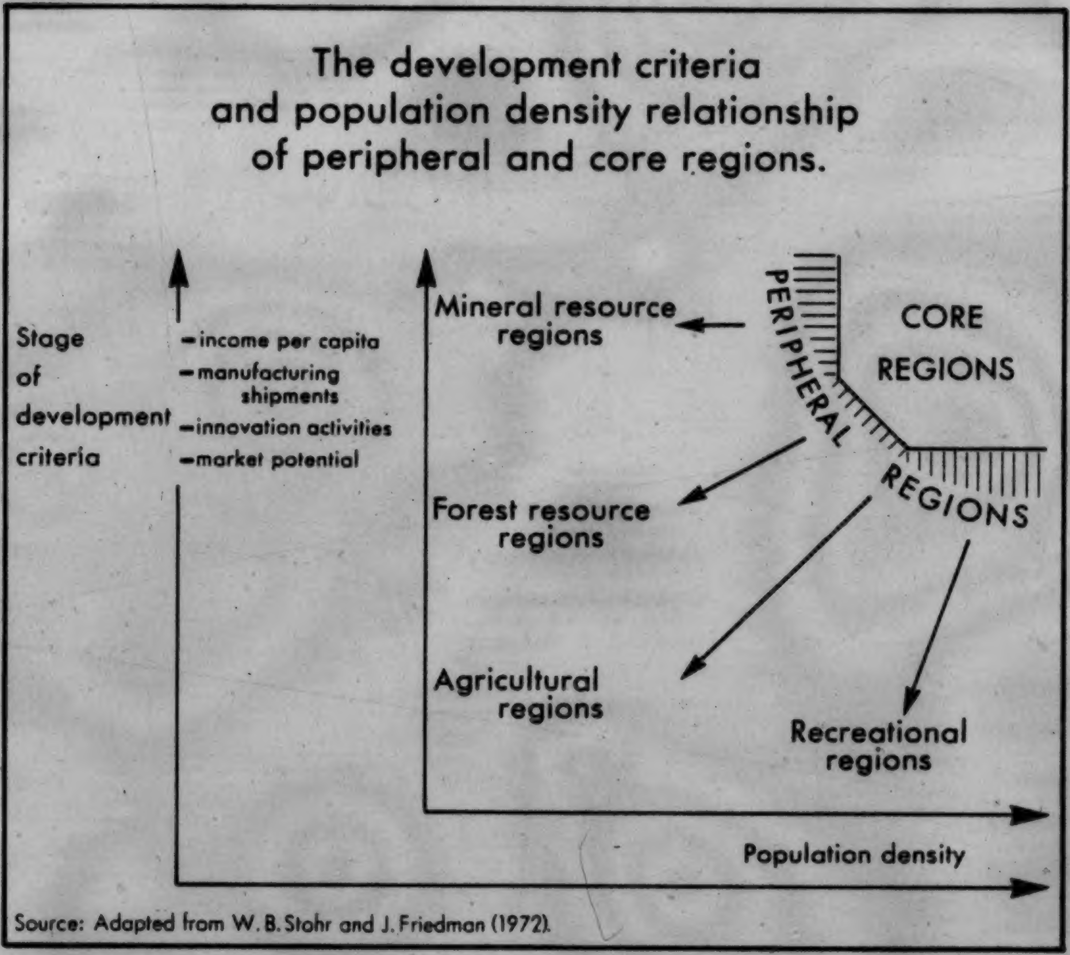


Figure 1 Basic life cycle of products


The development criteria and population density relationship of peripheral and core regions.
Stage of development criteria
-income per capita
-manufacturing shipments
-innovation activities
-market potential
Mineral resource regions
Forest resource regions
Agricultural regions
Recreational regions
PERIPHERAL REGIONS
CORE REGIONS
Population density

Source: Adapted from W. B. Stohr and J. Friedman (1972).

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Figure 2

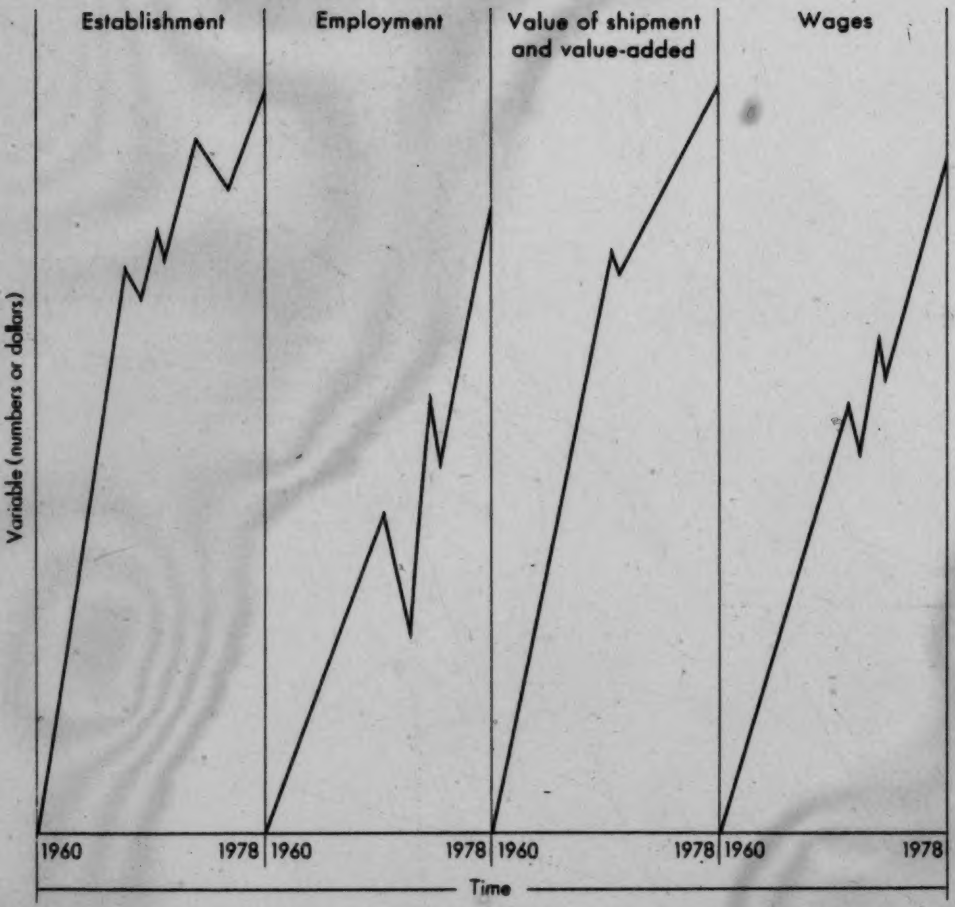
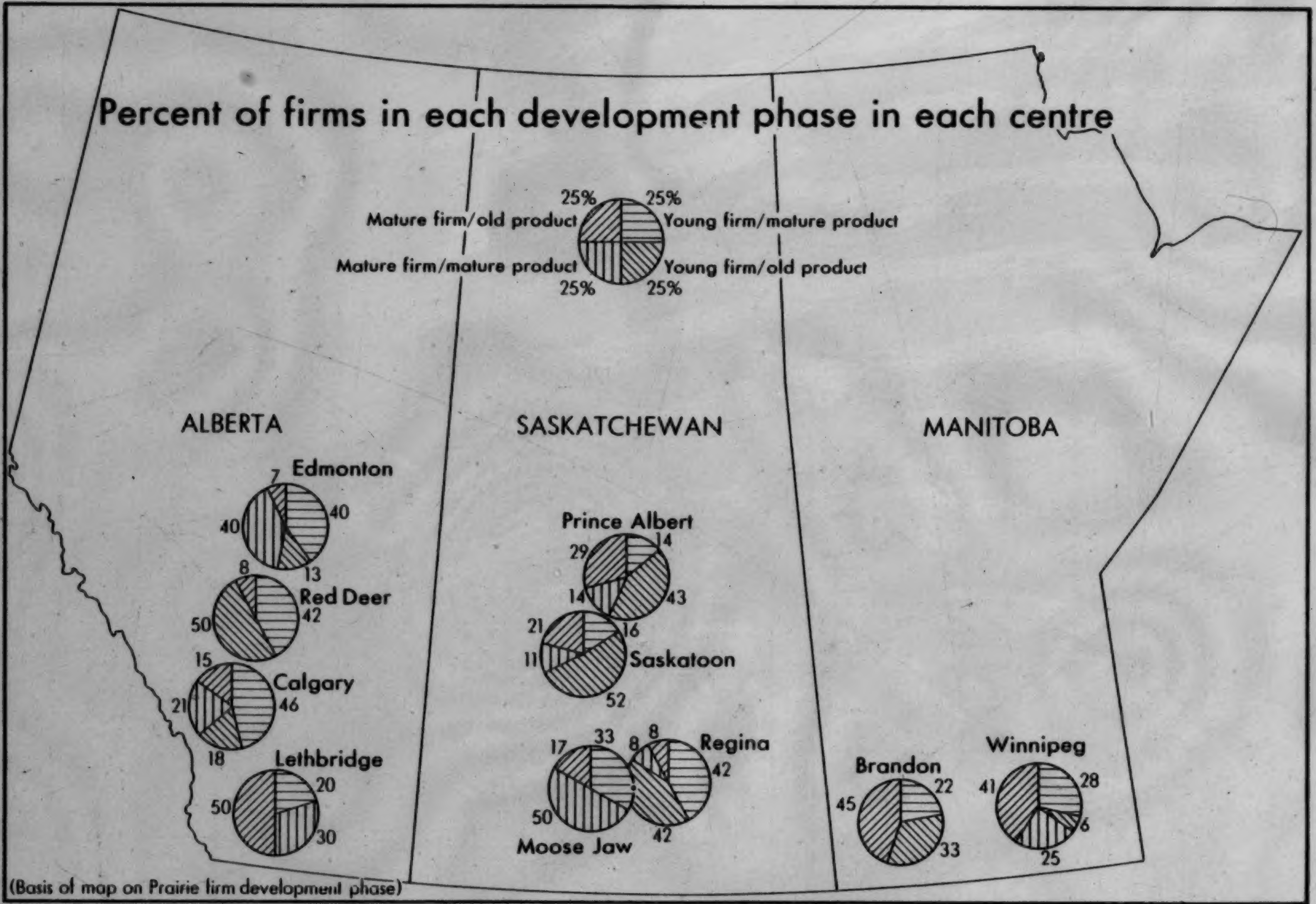
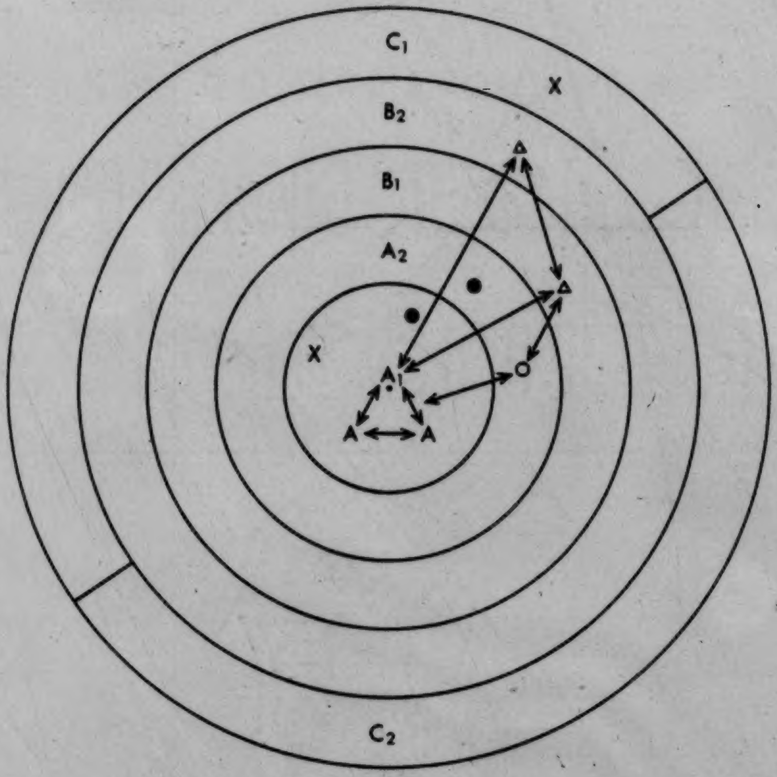


Figure 3 Generalized growth patterns of nine industrial sectors

Figure 4

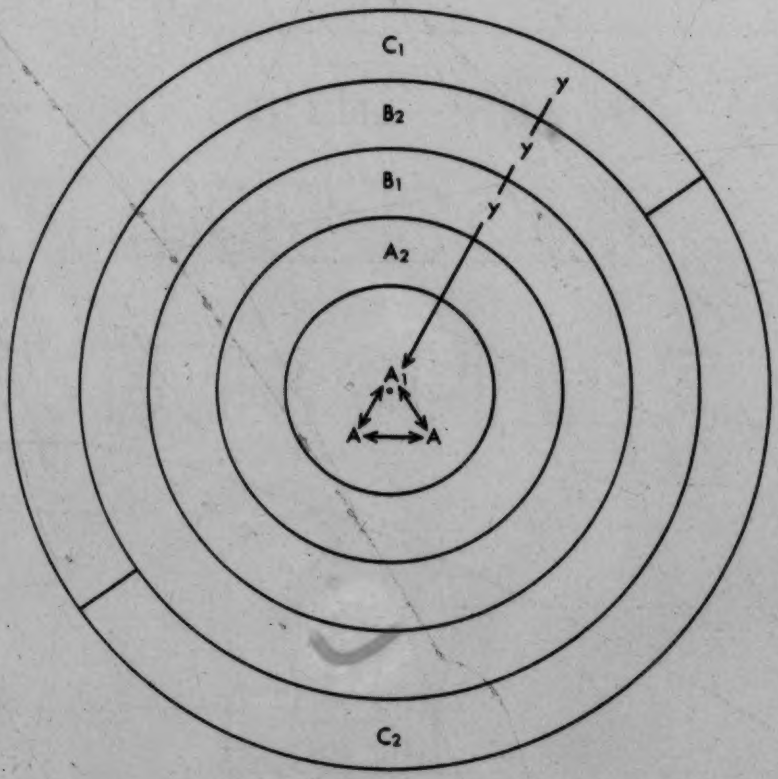

Percent of firms in each development phase in each centre
25%
25%
Mature firm/old product
Young firm/mature product
Mature firm/mature product
Young firm/old product
25%
25%
ALBERTA
SASKATCHEWAN
MANITOBA
Edmonton
7
40
40
13
Red Deer
8
50
42
Calgary
15
21
46
18
Lethbridge
50
20
30
Prince Albert
29
14
14
43
Saskatoon
21
16
11
52
Moose Jaw
17
33
50
Regina
8
8
42
42
Brandon
45
22
33
Winnipeg
41
28
6
25

(Basis of map on Prairie firm development phase)



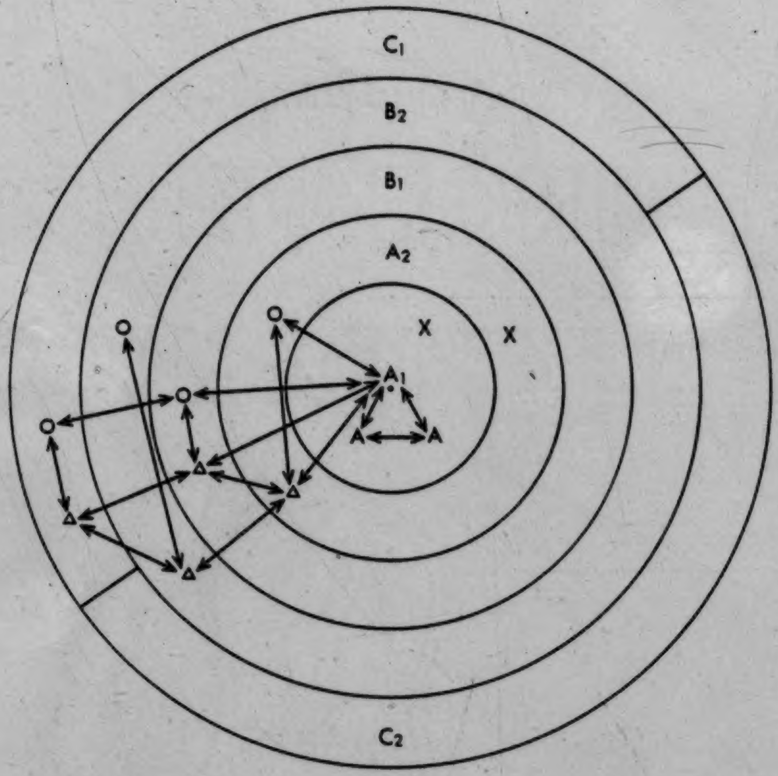
A_1	Core area. Founding area. Head office. Main market area for the regional firms
A_2	Province
B_1	Regional. Main market area for the metropolitan firms
B_2	National (country)
C_1	Foreign countries (favourable). Major areas of activity
C_2	Foreign countries (unfavourable)
A	Divisions of company
X	Relocation sites
●	Sales office (branch) — regional firms
△	Branch plant — metropolitan firms
○	Sales offices of metropolitan firms

Figure 5 Young firm / mature product



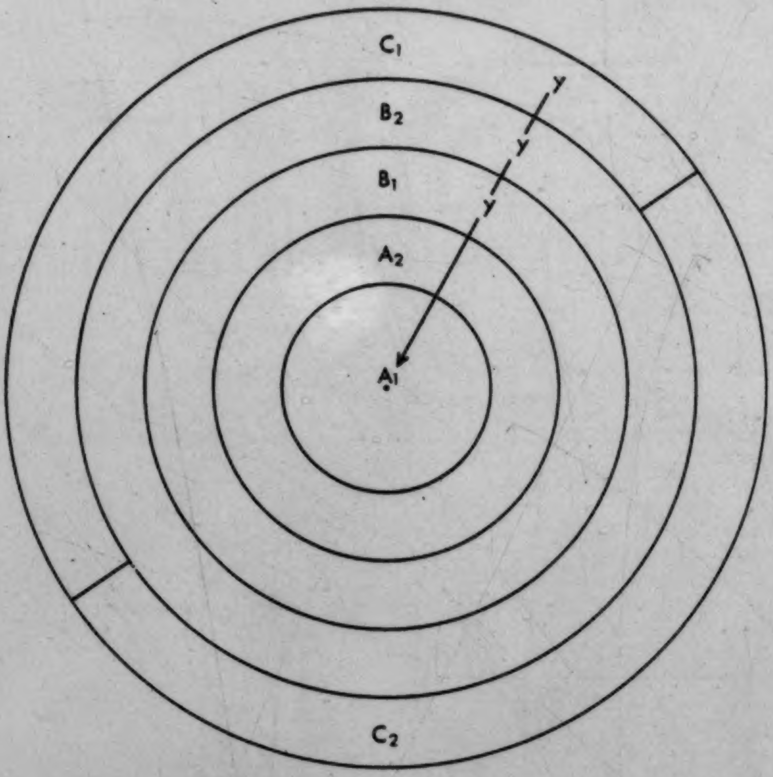
A$_1$	Core area. Head office. Main market area for the metropolitan firms
A$_2$	Province
B$_1$	Regional. Main market area for the regional firms
B$_2$	National (country)
C$_1$	Foreign countries (favourable)
C$_2$	Foreign countries (unfavourable)
A	Divisions of company
y	Imports of industrial products for distribution

Figure 6 Young firm/old product



A_1	Core area. Head office
A_2	Province
B_1	Regional
B_2	National (country)
C_1	Foreign countries (favourable)
C_2	Foreign countries (unfavourable)
A	Divisions of company
△	Branch plants of metropolitan firms
X	Relocation sites
O	Sales offices of metropolitan firms

Figure 7 Mature firm / mature product



A$_1$	Core area. Head office
A$_2$	Province. Main trade area
B$_1$	Regional
B$_2$	National (country)
C$_1$	Foreign countries (favourable)
C$_2$	Foreign countries (unfavourable)
y	Importer of industrial products from every region for distribution

Figure 8 Mature firm / old product

TABLE I

Characteristics of the Product Cycle According to Hirsch

Characteristics	Cycle Phase		
	Early	Growth	Mature
Technology	short runs changing techniques	mass production introduced frequent variations in techniques	long runs stable technology
capital intensity	low	high	high
Industry structure	specialized firms	increasing entries	declining entries
Human inputs	scientific	management	unskilled labour
demand structure	seller's market	declining prices	buyer's market

Source: Adapted from "The United States Electronics Industry" in The Product Life Cycle and International Trade. Edited by L.T. Wells, Harvard Business School, Cambridge, 1972. page 40.

TABLE 2

(a) Percentage Rate of Change of Manufacturing Hourly Earnings 1960-80 Urban Centres

Year	Province/Region				
	Prairie Region	Ontario	Manitoba	Saskatchewan	Alberta
1960-61	3	3	3	4	4
1961-62	2	3	2	2	2
1962-63	1	4	-1	3	1
1963-64	3	3	2	2	3
1964-65	3	6	3	2	3
1965-66	6	5	5	6	6
1966-67	9	6	10	8	8
1967-68	9	7	8	10	8
1968-69	8	8	7	7	10
1969-70	9	8	10	7	10
1970-71	7	9	7	9	9
1971-72	8	8	8	7	8
1972-73	10	8	9	7	13
1973-74	13	11	15	13	13
1974-75	18	14	18	20	18
1975-76	14	13	11	14	13
1976-77	11	10	10	12	11
1977-78	6	7	6	6	7
1978-79	10	8	9	10	10
1979-80	11	9	10	9	12

(b) Regression Results

	a	b	R^2	t values
Prairie Region	3.1	.3	87	11.3
Ontario	3.1	.24	89	12.8
Manitoba	2.7	.23	88	11.9
Saskatchewan	3.3	.30	87	11.2
Alberta	3.5	.31	87	11.2

Sources: Compiled and Adapted from Statistics Canada

TABLE 3: AGRICULTURAL IMPLEMENTS - Regression Results of Selected Variable and Year

(T values, shown in brackets, indicate that b coefficients are significant at the 1 per cent level.)

	Ontario			Manitoba			Saskatchewan			Alberta		
	a	b	R^2	a	b	R^2	a	b	R^2	a	b	R^2
Establishment	3.4	0.04	.89	2.7	0.02	.52	1.9	0.09	.80	2.1	0.06	.78
	(90.6)	(11.6)		(43.9)	(4.3)		(15.6)	(8.4)		(24.2)	(7.7)	
Production Employment	NS			6.2	0.09	.77	3.7	0.19	.93	5.0	0.05	.47
				(45.3)	(7.5)		(25.6)	(15.3)		(34.6)	(3.9)	
Total Employment	NS			6.4	0.09	.81	4.2	0.18	.90	NS		
				(53.1)	(8.6)		(24.7)	(12.2)				
Value of Shipments	11.6	0.08	.76	9.0	0.17	.91	6.8	0.24	.97	7.8	0.12	.78
	(95.6)	(7.4)		(62.1)	(13.1)		(58.9)	(23.8)		(44.8)	(7.7)	
Value added	10.8	0.07	.79	8.2	0.16	.87	6.4	0.23	.97	7.2	0.11	.69
	(99.2)	(7.9)		(46.1)	(10.5)		(58.1)	(23.8)		(36.4)	(6.2)	
Production Wages	10.2	0.08	.77	6.9	0.18	.94	4.7	0.25	.97	6.0	0.12	.85
	(86.7)	(7.6)		(54.6)	(15.9)		(39.5)	(24.9)		(41.9)	(9.6)	
Total Wages	10.5	0.07	.80	7.5	0.16	.94	5.5	0.25	.96	6.8	0.09	.68
	(104.1)	(8.3)		(67.2)	(16.9)		(38.4)	(19.9)		(38.5)	(5.9)	

a = Constant
b = Rate of Change

TABLE 4 : MACHINE SHOPS - Regression Results of Selected Variables and Year

(T values, shown in brackets, indicate that b coefficients are significant at the 1 per cent level.)

	Ontario			Manitoba			Saskatchewan			Alberta		
	a	b	R^2	a	b	R^2	a	b	R^2	a	b	R^2
Establishment	NS			3.8	-0.02	.80	3.2	0.02	.50	NS		
				(140.9)	(-8.2)		(47.2)	(4.1)				
Production Employment	NS			5.8	0.02	.48	4.2	0.09	.92	NS		
				(105.5)	(3.8)		(57.1)	(13.8)				
Total Employment	NS			6.1	0.02	.69	4.5	0.08	.88	NS		
				(149.1)	(6.0)		(53.7)	(10.9)				
Value of Shipments	10.1	0.09	.92	8.3	0.09	.94	6.0	0.20	.81	9.3	0.06	.78
	(127.8)	(13.2)		(139.3)	(15.4)		(22.3)	(8.1)		(104.5)	(7.6)	
Value added	9.4	0.09	.89	7.7	0.08	.96	6.1	0.16	.97	8.8	0.07	.82
	(11.2)	(12.0)		(160.0)	(19.0)		(77.0)	(22.0)		(102.0)	(8.7)	
Production Wages	8.9	0.10	.92	6.9	0.09	.95	5.2	0.16	.97	7.9	0.07	.88
	(108.0)	(13.0)		(124.0)	(17.0)		(69.0)	(23.0)		(101.0)	(10.0)	
Total Wages	9.3	0.09	.92	7.3	0.09	.96	5.6	0.15	.96	8.3	0.06	.83
	(121.0)	(14.0)		(161.0)	(21.0)		(70.0)	(21.0)		(104.0)		

TABLE 5: ORNAMENTAL AND ARCHITECTURAL (SIC 3446) - Regression Results of Selected Variables and Year

(T values, shown in brackets, indicate that b coefficients are significant at the 1 per cent level.)

	Ontario			Manitoba			Saskatchewan			Alberta		
	a	b	R^2	a	b	R^2	a	b	R^2	a	b	R^2
Establishment	5.4	0.02	.75	2.7	0.06	.89	2.1	0.08	.85	3.3	0.04	.77
	(232.0)	(5.0)		(56.0)	(8.0)		(27.0)	(7.0)		(72.0)	(5.0)	
Production Employment	8.2	0.03	.60	4.8	0.11	.86	3.5	0.08	.56	NS		
	(161.0)	(3.0)		(47.0)	(7.0)		(22.0)	(3.0)				
Total Employment	NS			5.2	0.11	.86	3.6	0.10	.70	NS		
				(50.0)	(7.0)		(25.0)	(4.0)				
Value of Shipments	11.1	0.08	.98	7.6	0.15	.95	5.9	0.15	.76	NS		
	(415.0)	(18.0)		(102.5)	(12.5)		(34.0)	(5.0)				
Value added	10.5	0.08	.94	6.9	0.16	.98	5.6	0.10	.67	NS		
	(202.0)	(10.0)		(100.0)	(16.0)		(29.0)	(4.0)				
Production Wages	9.4	0.08	.95	5.9	0.17	.94	4.5	0.13	.82	NS		
	(230.0)	(12.0)		(65.0)	(11.0)		(33.0)	(6.0)				
Total Wages	9.9	0.08	.94	6.4	0.15	.96	4.8	0.14	.83	NS		
	(232.0)	(12.0)		(88.0)	(13.0)		(34.0)	(6.0)				

TABLE 6 : METAL DOOR ETC. (SIC 3442) - Regression Results of Selected Variables and Year

(T values, shown in brackets, indicate that b coefficients are significant at the 1 per cent level.)

	Ontario			Manitoba			Saskatchewan			Alberta		
	a	b	R^2	a	b	R^2	a	b	R^2	a	b	R^2
Establishment	NS			2.1	0.04	.57	NS			2.6	0.04	.67
				(27.0)	(3.0)					(42.0)	(4.0)	
Production Employment	NS			NS			4.1	0.07	.82	NS		
							(51.0)	(5.0)				
Total Employment	NS			NS			4.4	0.06	.80	6.3	0.08	.79
							(61.0)	(4.0)		(64.0)	(3.9)	
Value of Shipments	11.0	0.09	.91	8.4	0.16	.94	7.3	0.16	.95	9.2	0.21	.98
	(147.0)	(6.0)		(114.0)	(10.0)		(80.0)	(9.0)		(134.0)	(15.0)	
Value added	10.3	0.09	.90	7.8	0.16	.97	5.9	0.23	.96	8.5	0.20	.98
	(131.0)	(6.0)		(121.0)	(12.0)		(52.0)	(10.0)		(130.0)	(15.0)	
Production Wages	9.4	0.08	.95	7.0	0.13	.94	5.6	0.18	.97	7.5	0.19	.98
	(196.0)	(8.0)		(87.0)	(8.0)		(72.0)	(11.0)		(102.0)	(13.0)	
Total Wages	7.5	0.20	.98	9.8	0.09	.95	7.4	0.14	.97	6.0	0.17	.96
	(102.0)	(13.0)		(198.0)	(9.0)		(133.0)	(12.0)		(74.0)	(10.0)	

TABLE 7: FABRICATED METAL BUILDINGS ETC. - Regression Results of Selected Variables and Year

(T values, shown in brackets, indicate that b coefficients are significant at the 1 per cent level.)

	Ontario			Manitoba			Saskatchewan			Alberta		
	a	b	R^2	a	b	R^2	a	b	R^2	a	b	R^2
Establishment	NS			2.9	-0.06	.80	2.7	-0.12	.90	NS		
				(46.0)	(-5.0)		(31.0)	(-8.0)				
Production Employment	NS			NS			NS			NS		
Total Employment	NS			NS			NS			NS		
Value of Shipments	11.3	0.14	.92	NS			6.0	0.31	.88	NS		
	(109.0)	(7.0)					(21.0)	(6.0)				
Value added	10.7	0.14	.92	NS			5.3	0.28	.84	NS		
	(109.0)	(7.0)					(18.0)	(5.0)				
Production Wages	9.6	0.13	.98	NS			NS			NS		
	(211.0)	(13.0)										
Total Wages	10.0	0.13	.98	NS			4.9	0.26	.65	NS		
	(247.0)	(15.0)					(10.0)	(3.0)				

TABLE 8: FABRICATED STRUCTURAL METAL - Regression Results of Selected Variables and Year

(T values, shown in brackets, indicate that b coefficients are significant at the 1 per cent level.)

	Ontario			Manitoba			Saskatchewan			Alberta		
	a	b	R^2	a	b	R^2	a	b	R^2	a	b	R^2
Establishment	3.5	0.05	.91	1.5	0.02	.41	NS			2.1	0.05	.74
	(81.0)	(13.0)		(30.0)	(3.0)					(25.0)	(7.0)	
Production Employment	NS			NS			5.0	0.05	.52	6.5	0.04	.57
							(36.0)	(4.0)		(61.0)	(4.0)	
Total Employment	NS			NS			5.4	0.05	.58	6.9	0.03	.64
							(48.0)	(5.0)		(102.0)	(5.0)	
Value of Shipments	11.4	0.07	.88	9.1	0.09	.79	8.2	0.10	.71	9.5	0.10	.90
	(157.0)	(10.0)		(68.0)	(8.0)		(46.0)	(6.0)		(96.0)	(12.0)	
Value added	10.7	0.08	.87	8.4	0.09	.70	6.9	0.13	.73	8.5	0.13	.86
	(127.0)	(10.0)		(48.0)	(6.0)		(32.0)	(7.0)		(57.0)	(10.0)	
Production Wages	9.9	0.08	.88	7.8	0.08	.86	6.1	0.14	.88	7.5	0.13	.93
	(102.0)	(10.0)		(73.0)	(9.0)		(38.0)	(10.0)		(68.0)	(13.0)	
Total Wages	10.2	0.08	.91	8.1	0.08	.92	6.6	0.13	.92	8.2	0.12	.95
	(147.0)	(12.0)		(119.0)	(13.0)		(61.0)	(14.0)		(109.0)	(17.0)	

TABLE 9: MISCELLANEOUS METAL - Regression Results of Selected Variables and Year

(T values, shown in brackets, indicate that b coefficients are significant at the 1 per cent level.)

	Ontario			Manitoba			Saskatchewan			Alberta		
	a	b	R^2	a	b	R^2	a	b	R^2	a	b	R^2
Establishment	5.4	0.03	.76	NS			NS			2.0	0.09	.96
	(133.0)	(7.0)								(41.0)	(20.0)	
Production Employment	8.9	0.03	.90	NS			NS			4.8	0.08	.85
	(219.0)									(38.0)	(6.0)	
Total Employment	9.2	0.03	.89	NS			NS			5.1	0.08	.80
	(237.0)	(7.0)								(32.0)	(5.0)	
Value of Shipments	11.8	0.10	.99	9.1	0.07	.95	NS			7.5	0.15	.88
	(442.0)	(38.0)		(145.0)	(11.0)					(34.0)	(7.0)	
Value added	11.1	0.09	.98	8.3	0.08	.92	NS			6.8	0.15	.86
	(225.0)	(20.0)		(96.0)	(9.0)					(28.0)	(6.0)	
Production Wages	10.1	0.09	.99	7.2	0.09	.97	5.4	0.07	.89	5.9	0.15	.93
	(878.0)	(85.0)		(123.0)	(14.0)		(52.0)	(7.0)		(36.0)	(10.0)	
Total Wages	10.5	0.09	.99	7.6	0.08	.98	6.0	0.07	.92	6.1	0.16	.92
	(560.0)	(50.0)		(171.0)	(18.0)		(80.0)	(8.0)		(32.0)	(8.0)	

TABLE 10a: Metal Stamping - Regression Results of Selected Variables and Year

Province (The t values, shown in brackets, indicate that the b coefficients are significant at the one percent level)

	Ontario			Manitoba			Saskatchewan			Alberta		
Variable	a	b	R^2	a	b	R^2	a	b	R^2	a	b	R^2
Establishment	5.7 (150)	.02 (5)	.68		NS			NS		3.1 (78)	.04 (12)	.89
Production Employment	9.1 (205)	.03 (8)	.81	6.7 (164)	.02 (3)	.38		NS		5.8 (70)	.05 (7)	.78
Total Employment	9.5 (288)	.03 (9)	.84		NS			NS			NS	
Value of Shipments		NS		9.1 (70)	.12 (9)	.86		NS		8.9 (102)	.12 (15)	.94
Value Added	(11) (526)	.09 (48)	.99	8.4 (58)	.12 (9)	.83	7.6 (41)	.04 (3)	.32	8.1 (114)	.13 (19)	.96
Production Wages	10.3 (424)	.10 (44)	.99	7.7 (97)	.09 (11)	.90		NS		6.5 (74)	.13 (15)	.94
Total Wages	10.8 (545)	.09 (51)	.99	8.1 (94)	.08 (10)	.87		NS		7.3 (86)	.13 (16)	.94

TABLE 10b: Metal Stamping (N.E.S.) - Regression Results of Selected Variables and Year

Province (The t values, shown in brackets, indicate that the b coefficients are significant at the one percent level)

	Ontario			Manitoba			Saskatchewan			Alberta		
Variable	a	b	R^2	a	b	R^2	a	b	R^2	a	b	R^2
Establishment		NS		3.1 (53)	.03 (3)	.52	1.8 (17)	.06 (3)	.61	3.3 (40)	.04 (3)	.49
Production Employment		NS			NS		4.3 (62)	.17 (11)	.93		NS	
Total Employment		NS			NS		4.9 (53)	.13 (7)	.95		NS	
Value of Shipments		NS		9.7 (69)	.18 (7)	.95	7.4 (568)	.31 (111)	.99	9.1 (97)	.28 (14)	.99
Value added		NS			NS		6.8 (80)	.26 (14)	.99	8.4 (63)	.28 (10)	.98
Production Wages	11.0 (151)	.13 (8)	.97	8.1 (99)	.14 (8)	.96	5.9 (115)	.25 (22)	.99	7.4 (60)	.20 (8)	.97
Total Wages		NS		8.4 (109)	.14 (8)	.97	6.6 (44)	.22 (7)	.96	7.9 (51)	.19 (6)	.94

TABLE 11

Distribution of Firm Population (Innovators and Non-Innovators) and Firm Sample

	INNOVATORS			NON-INNOVATORS		
		Firms Interviewed			Firms Interviewed	
Centres	# of Firms in Patent List	#	% of Patent List	# of Relevant Firms in Trade Directory List	#	% of Trade Directory List
Winnipeg	61	25	41	65	29	45
Edmonton	32	12	38	34	16	47
Calgary	43	20	47	47	19	40
Saskatoon	21	9	43	29	10	34
Regina	15	7	47	14	5	36
Sub Total	172	73		189	79	
Lethbridge	5	3	60	15	7	47
Red Deer	5	3	60	18	9	50
Brandon	4	3	75	13	6	46
Prince Albert	3	2	67	12	6	50
Moose Jaw	3	1	33	11	5	45
Sub Total	20	12		69	33	
TOTAL	192	85		258	112	

Sources:
(i) Patent Office Records (1969 to 1979)
(ii) Trade Directories of Alberta, Saskatchewan and Manitoba (1978/79)
(iii) Individual Trade Directories of the Centres listed above.

TABLE 12

Distribution of Sampled Firms By Individual Centre, Centre Groupings, and Prairie

(As a Proportion of all Firms in Each Manufacturing Industry Selected)

Centre Levels / Industrial Sectors	Lumber & Wood Products	Chemical	Rubber & Plastics	Stone/Concrete	Primary Metal	Fabricated Metal	Machinery	Electrical	Transport Equipment	Measuring Instruments	Miscellaneous
Calgary Sample - #		2	5	1		9	11	4	4		2
Industry - #		9	11	4		30	39	11	10		19
% of Industry		22	45	25		30	28	37	40		11
Edmonton Sample		1	5		1	6	15				
Industry		5	21		3	39	46				
% of Industry		20	21		33	16	33				
Winnipeg Sample			7		2	11	24	3	4	4	
Industry			21		5	30	66	14	20	13	
% of Industry			31		40	37	36	21	20	31	
Regina Sample						5	6				3
Industry						3	10				9
% of Industry						60	60				33
Saskatoon Sample			1	1		6	8		3		
Industry			3	3		17	15		5		
% of Industry			33	33		35	53		60		
Lethbridge Sample						2	5		2		1
Industry						9	10		4		4
% of Industry						22	50		50		25
Red Deer Sample						5	4		3		
Industry						7	8		5		
% of Industry						71	50		60		
Moose Jaw Sample	2	1				3					
Industry	5	1				6					
% of Inudstry	40	100				50					
Prince Albert Sample	3	1				2	1				
Industry	6	1				4	3				
% of Industry	50	100				50	33				
Brandon Sample		1				2	3	1	2		
Industry		2				4	4	2	4		
% of Industry		50				50	75	50	50		
All Metropolitan Sample		3	18	2	3	35	64	7	11	4	5
Industry		14	56	7	8	121	176	25	35	13	28
% of Industry		22	32	29	38	29	37	28	32	31	19
All Regional Sample	5	3				14	13	1	7		1
Industry	11	4				30	25	2	13		4
% of Industry	46	75				47	52	50	54		25
All Sample (Prairie)		6				49	77	8	18		6
Industry		18				151	201	27	48		32
% of Industry		33				33	38	30	38		19

TABLE 13

Date of Establishment of Firm
(Groups of Centres)

Year	ALL FIRMS		WEC		RS		MLBPR		WRSEC	
	#	%	#	%	#	%	#	%	#	%
Before 1900	4	2	3	2	--	---	1	2	3	2
1900-1920	11	6	9	7	--	---	2	4	9	6
1921-1940	20	10	15	12	2	6	3	7	17	11
1941-1950	25	13	15	12	3	10	7	16	18	12
1951-1960	27	14	17	14	3	10	7	16	20	13
1961-1970	68	35	43	36	14	45	11	24	57	38
1971-1975	28	14	15	12	4	13	9	20	19	13
1976	11	6	2	2	5	16	4	9	7	5
N/A	---	---	2	2	0	---	1	2	2	1
TOTAL	197	100	121	100	31	100	45	100	152	100

TABLE 13 (continued)

Date of Establishment of Firm
(Individual Cities)

	FIRMS IN																			
	WINN		MOOS		LETH		BRAN		PRIN		REGI		SASK		REDD		EDMO		CALG	
Year	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Before 1900	1	2	-	---	1	10	-	---	-	---	--	---	--	---	--	---	--	---	2	5
1900-1920	8	15	1	17	--	---	-	---	1	12	--	---	--	---	--	---	1	4	--	---
1921-1940	13	24	-	---	--	---	2	22	-	---	1	8	1	5	1	8	2	7	--	---
1941-1950	7	13	-	---	4	40	2	22	1	12	1	8	2	10	--	---	1	4	7	18
1951-1960	6	11	3	50	3	30	-	---	1	12	--	---	3	16	--	---	6	22	5	13
1961-1970	15	28	1	17	2	20	4	44	2	25	6	50	8	42	3	25	9	33	19	49
1971-1975	3	6	1	17	--	---	1	11	1	12	1	8	3	16	5	42	6	22	6	15
1976	--	---	-	---	--	---	-	---	1	12	3	25	2	10	3	25	2	7	--	---
N/A	1	2	-	---	--	---	-	---	1	---	0	---	0	---	0	---	1	---	0	0
TOTAL	54	100	6	100	10	100	9	100	7	100	12	100	19	100	12	100	27	100	39	100

TABLE 14

Multiple Response Analysis on the Age of the Products by Years on Market

(a) All the Firms

Years	Count	PCT of Responses	PCT of Cases
<5	1	0.2	0.5
6 - 10	19	4.6	9.8
11 - 15	54	13.0	27.8
16 - 20	81	19.5	41.8
21 - 30	102	24.6	52.6
31 - 40	83	20.0	42.8
41 - 50	58	14.0	29.9
>50	17	4.1	8.8
TOTALS	415	100.0	213.9

TABLE 14 (continued)

Multiple Response Analysis on the Age of the Products by Years on Market

(b) Winnipeg, Regina, Saskatoon, Edmonton, Calgary

Years	Count	PCT of Responses	PCT of Cases
6 - 10	18	5.5	12.0
11 - 15	45	13.8	30.0
16 - 20	63	19.3	42.0
21 - 30	84	25.8	56.0
31 - 40	66	20.2	44.0
41 - 50	40	12.3	26.7
>50	10	3.1	6.7
TOTALS	326	100.0	217.3

TABLE 14 (continued)

Multiple Response Analysis on the Age of the Products by Years on Market

(c) Moose Jaw, Lethbridge, Brandon,
Prince Albert, Red Deer

Years	Count	PCT of Responses	PCT of Cases
<5	1	1.1	2.3
6 - 10	1	1.1	2.3
11 - 15	9	10.1	20.5
16 - 20	18	20.2	40.9
21 - 30	18	20.2	40.9
31 - 40	17	19.1	38.6
41 - 50	18	20.2	40.9
>50	7	7.9	15.9
TOTALS	89	100.0	202.3

TABLE 15

Multiple Response Crosstabulation

Between the Ages of the Firms and the Ages of the Products

(3 responses on products)

A. ALL THE FIRMS

Product (Years on market)	Age of Firms (Date of Establishment)								
	Before 1900	1900-1920	1921-1940	1941-1950	1951-1960	1961-1970	1971-1975	1976-	ROW TOTAL
< 5 years	0	0	0	1	0	0	0	0	1*
	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.5**
6-10 years	1	0	2	3	2	8	3	0	19
	0.5	0.0	1.0	1.6	1.0	4.2	1.6	0.0	9.9
11-15 years	1	2	5	5	5	25	8	2	53
	0.5	1.0	2.6	2.6	2.6	13.1	4.2	1.0	27.7
16-20 years	1	4	7	12	11	30	11	4	80
	0.5	2.1	3.7	6.3	5.8	15.7	5.8	2.1	41.9
21-30 years	1	4	6	13	21	37	14	5	101
	0.5	2.1	3.1	6.8	11.0	19.4	7.3	2.6	52.9
31-40 years	2	4	7	17	12	25	11	4	82
	1.0	2.1	3.7	8.9	6.3	13.1	5.8	2.1	42.9
41-50 years	1	4	12	9	7	13	8	2	56
	0.5	2.1	6.3	4.7	3.7	6.8	4.2	1.0	29.3
> 50 years	2	4	4	2	0	4	1	0	17
	1.0	2.1	2.1	1.0	0.0	2.1	0.5	0.0	8.9
COLUMN TOTAL	4	11	19	25	26	67	28	11	191
	2.1	5.8	9.9	13.1	13.6	35.1	14.7	5.8	100.0

PERCENTS AND TOTALS BASED ON RESPONDENTS

VALID CASES 191 MISSING CASES 6

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* Total

** Percent

TABLE 15 (continued)

Multiple Response Crosstabulation

Between the Ages of the Firms and the Ages of the Products

(3 responses on products)

B. WINNIPEG, REGINA, SASKATOON, EDMONTON, CALGARY

Product (Years on market)	Age of Firms (Date of Establishment)								
	Before 1900	1900-1920	1921-1940	1941-1950	1951-1960	1961-1970	1971-1975	1976-	ROW TOTAL
6-10 years	1	0	2	3	2	7	3	0	18*
	0.7	0.0	1.4	2.0	1.4	4.7	2.0	0.0	12.2**
11-15 years	1	1	5	5	2	22	7	2	45
	0.7	0.7	3.4	3.4	1.4	14.9	4.7	1.4	30.4
16-20 years	1	4	6	8	8	26	9	1	63
	0.7	2.7	4.1	5.4	5.4	17.6	6.1	0.7	42.6
21-30 years	1	3	6	12	17	32	9	3	83
	0.7	2.0	4.1	8.1	11.5	21.6	6.1	2.0	56.1
31-40 years	2	4	6	13	11	18	7	4	65
	1.4	2.7	4.1	8.8	7.4	12.2	4.7	2.7	43.9
41-50 years	1	3	9	5	5	10	3	2	38
	0.7	2.0	6.1	3.4	3.4	6.8	2.0	1.4	25.7
> 50 years	1	3	3	1	0	2	0	0	10
	0.7	2.0	2.0	0.7	0.0	1.4	0.0	0.0	6.8
COLUMN TOTAL	3	9	16	18	20	56	19	7	148
	2.0	6.1	10.8	12.2	13.5	37.8	12.8	4.7	100.0

PERCENTS AND TOTALS BASED ON RESPONDENTS

VALID CASES 148 MISSING CASES 4

* Total
** Percent

TABLE 15 (continued)

Multiple Response Crosstabulation

Between the Ages of the Firms and the Ages of the Products

(3 responses on products)

C. REGINA/SASKATOON

Product (Years on market)	Age of Firms (Date of Establishment)								
	Before 1900	1900-1920	1921-1940	1941-1950	1951-1960	1961-1970	1971-1975	1976-	ROW TOTAL
11-15 years			0	1	0	8	2	1	12*
			0.0	3.2	0.0	25.8	6.5	3.2	38.7**
16-20 years			1	2	1	3	2	1	10
			3.2	6.5	3.2	9.7	6.5	3.2	32.3
21-30 years			1	2	2	11	1	2	19
			3.2	6.5	6.5	35.5	3.2	6.5	61.3
31-40 years			2	3	3	7	2	4	21
			6.5	9.7	9.7	22.6	6.5	12.9	67.7
41-50 years			1	1	1	1	0	2	6
			3.2	3.2	3.2	3.2	0.0	6.5	19.4
> 50 years			1	0	0	1	0	0	2
			3.2	0.0	0.0	3.2	0.0	0.0	6.5
COLUMN TOTAL			2	3	3	14	4	5	31
			6.5	9.7	9.7	45.2	12.9	16.1	100.0

PERCENTS AND TOTALS BASED ON RESPONDENTS

VALID CASES 31 MISSING CASES 0

* Total
** Percent

TABLE 15 (continued)

Multiple Response Crosstabulations

Between the Ages of the Firms and the Ages of the Products

(3 responses on products)

D. MOOSE JAW, LETHBRIDGE, PRINCE ALBERT, BRANDON, RED DEER

Product (Years on market)	Age of Firms (Date of Establishment)								
	Before 1900	1900-1920	1921-1940	1941-1950	1951-1960	1961-1970	1971-1975	1976-	ROW TOTAL
< 5 years	0 0.0	0 0.0	0 0.0	1 2.3	0 0.0	0 0.0	0 0.0	0 0.0	1* 2.3**
6-10 years	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	1 2.3	0 0.0	0 0.0	1 2.3
11-15 years	0 0.0	1 2.3	0 0.0	0 0.0	3 7.0	3 7.0	1 2.3	0 0.0	8 18.6
16-20 years	0 0.0	0 0.0	1 2.3	4 9.3	3 7.0	4 9.3	2 4.7	3 7.0	17 39.5
21-30 years	0 0.0	1 2.3	0 0.0	1 2.3	4 9.3	5 11.6	5 11.6	2 4.7	18 41.9
31-40 years	0 0.0	0 0.0	1 2.3	4 9.3	1 2.3	7 16.3	4 9.3	0 0.0	17 39.5
41-50 years	0 0.0	1 2.3	3 7.0	4 9.3	2 4.7	3 7.0	5 11.6	0 0.0	18 41.9
> 50 years	1 2.3	1 2.3	1 2.3	1 2.3	0 0.0	2 4.7	1 2.3	0 0.0	7 16.3
COLUMN TOTAL	1 2.3	2 4.7	3 7.0	7 16.3	6 14.0	11 25.6	9 20.9	4 9.3	43 100.0

PERCENTS AND TOTALS BASED ON RESPONDENTS

VALID CASES 43 MISSING CASES 2

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* Total
** Percent

TABLE 15 (continued)

Multiple Response Crosstabulations

Between the Ages of the Firms and the Ages of the Products

(3 responses on products)

E. WINNIPEG, EDMONTON, CALGARY

Product (Years on market)	Age of Firms (Date of Establishment)								
	Before 1900	1900-1920	1921-1940	1941-1950	1951-1960	1961-1970	1971-1975	1976-	ROW TOTAL
6-10 years	1 0.9	0 0.0	2 1.7	3 2.6	2 1.7	7 6.0	3 2.6	0 0.0	18* 15.4**
11-15 years	1 0.9	1 0.9	5 4.3	4 3.4	2 1.7	14 12.0	5 4.3	1 0.9	33 28.2
16-20 years	1 0.9	4 3.4	5 4.3	6 5.1	7 6.0	23 19.7	7 6.0	0 0.0	53 45.3
21-30 years	1 0.9	3 2.6	5 4.3	10 8.5	15 12.8	21 17.9	8 6.8	1 0.9	64 54.7
31-40 years	2 1.7	4 3.4	4 3.4	10 8.5	8 6.8	11 9.4	5 4.3	0 0.0	44 37.6
41-50 years	1 0.9	3 2.6	8 6.8	4 3.4	4 3.4	9 7.7	3 2.6	0 0.0	32 27.4
> 50 years	1 0.9	3 2.6	2 1.7	1 0.9	0 0.0	1 0.9	0 0.0	0 0.0	8 6.8
COLUMN TOTAL	3 2.6	9 7.7	14 12.0	15 12.8	17 14.5	42 35.9	15 12.8	2 1.7	117 100.0

PERCENTS AND TOTALS BASED ON RESPONDENTS

VALID CASES 117 MISSING CASES 4

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* Total

** Percent

TABLE 16

Reclassified Age Distributions
of Firms

	ALL		WRSEC		MLBPR	
Age (Establishment)	# of Firms	%	# of Firms	%	# of Firms	%
Mature	87	45	67	45	20	20
Young	107	55	83	55	24	24

TABLE 17

Reclassified Age Distributions
of Products

	ALL		WRSEC		MLBPR	
Age (Products)	# of Firms	%	# of Firms	%	# of Firms	%
Mature	104	54	85	57	19	43
Old	90	46	65	43	25	57

TABLE 18

Chi-Square Results of Development Phase
(Age of Products with Age of Firms)

(a) All the Firms

Young firms - mature products
Mature firms - mature products
Chi-Square = 11.4 with 3df; Significance = 0.009

(b) Metropolitan Centres (150 Firms)

Young firms - mature products
Mature firms - mature products
Chi-Square = 7.3 with 3df; Significance = 0.05

(c) Regional Centres (44 Firms)

Young firms - old products
Chi-Square = 7.0 with 3df; Significance = 0.05

TABLE 19

Deciding Factor Underlying Initial Location of Firm
(Groups of Centres)

FACTORS	ALL FIRMS		WEC*		RS*		MLBPR*		WRSEC*	
	#	%	#	%	#	%	#	%	#	%
Acquisition	9	5	4	3	--	---	5	11	4	3
Personal/Chance	119	61	81	67	21	68	17	38	102	67
Proximity-Parent	4	2	3	2	--	---	1	2	3	2
Government incentives	5	3	1	1	1	3	3	7	2	1
Favorable Economy	32	16	21	17	3	10	8	18	24	16
R & D	7	4	4	3	2	6	1	2	6	4
Resources/Labour	4	2	---	---	--	---	4	9	---	---
Transport	12	6	5	4	4	13	3	7	9	6
Plant site	4	2	1	1	--	---	3	7	1	1
N/A	---	---	1	1	--	---	--	---	1	1
TOTAL	196	100	121	100	31	100	45	100	152	100

TABLE 20

Ranking of Initial Location Factors

ALL FIRMS

RANK FACTORS	1 #	 %	2 #	 %	3 #	 %	4 #	 %	5 #	 %	% of Cases
Personal	41	21	1	1	15	8	2	1	138	70	197
Proximity-Parent	18	94	--	--	3	2	--	--	9	5	197
Related firms	108	55	18	9	30	15	28	14	13	7	197
Favorable economy	4	2	3	2	33	17	95	48	62	32	197
Provincial market	9	5	2	1	33	17	86	44	67	34	197
Resources	28	14	32	16	90	48	32	16	15	8	197
Labour	22	11	66	34	84	43	17	9	8	4	197
Transport	26	13	26	13	96	49	27	14	22	11	197
Plant site	28	14	20	10	85	43	46	23	18	9	197
Professional services	110	56	43	22	34	17	7	4	3	1	197
R & D	73	37	36	18	29	15	39	20	20	10	197
Gov't incentives	174	88	6	3	11	6	2	1	4	2	197
Mfg. arm of org.	2	2	--	--	2	20	2	21	4	10	10

TABLE 20 (continued)

Ranking of Initial Location Factors

MLBPR

RANK	1		2		3		4		5		M		% of
FACTORS	#	%	#	%	#	%	#	%	#	%	#	%	Cases
Personal	17	38	1	2	4	9	--	--	23	51			45
Proximity-Parent	41	91	--	--	1	2	--	--	3	7			45
Related firms	26	58	4	9	9	20	4	9	2	4			45
Favorable economy	--	--	2	4	10	22	18	40	15	33			45
Provincial market	1	2	1	2	7	16	23	51	13	29			45
Resources	3	7	2	4	23	51	8	18	9	20			45
Labour	2	4	8	18	29	64	3	7	3	7			45
Transport	1	2	7	16	26	58	4	9	7	16			45
Plant site	2	4	3	7	19	42	10	22	11	24			45
Professional services	16	36	15	33	11	24	1	2	2	4			45
R & D	21	47	10	22	4	9	6	13	4	9			45
Gov't incentives	34	76	2	4	5	11	1	2	3	7			45
Mfg. arm of org.	--	--	--	--	1	2	2	4	1	2	41	91	

WRSEC

RANK	1		2		3		4		5		M		# of
FACTORS	#	%	#	%	#	%	#	%	#	%	#	%	Cases
Personal	24	16	--	--	11	7	2	1	115	76			152
Proximity-Parent	144	95	--	--	2	1	--	---	6	4			152
Related firms	82	54	--	--	21	14	--	---	11	7			152
Favorable economy	4	3	1	1	23	15	77	51	47	31			152
Provincial market	8	5	1	1	26	17	63	41	54	36			152
Resources	25	16	30	20	67	44	24	16	6	4			152
Labour	20	13	58	38	55	36	14	9	5	3			152
Transport	25	16	19	13	70	46	23	15	15	10			152
Plant site	26	17	17	11	66	43	36	24	7	5			152
Professional services	94	62	28	18	23	15	6	4	1	1			152
R & D	52	34	26	17	25	16	33	22	16	11			152
Gov't incentives	140	92	4	3	6	4	1	1	1	1			152
Mfg. arm of org.	2	1	--	--	1	1	--	---	3	2	146	96	

TABLE 21

Type of Ownership
(Groups of Centres)

OWNERSHIP STATUS	ALL FIRMS #	ALL FIRMS %	MLBPR #	MLBPR %	WRSEC #	WRSEC %
Partnership	22	11	1	2	21	14
Incorporated Private	139	71	38	84	101	66
Incorporated Public	32	16	4	9	28	18
Incorporate Cooperative	1	1	1	2	---	---
Other	1	1	--	---	1	1
N/A	---	---	1	2	1	1
TOTAL	195	100	45	100	152	100

TABLE 21b(continued)

Deciding Factor Underlying Initial Location
(Individual Centres)

	FIRMS IN																			
	WINN*		MOOS*		LETH*		BRAN*		PRIN*		REGI*		SASK*		REDD*		EDMO*		CALG*	
FACTORS	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Acquisition	--	---	-	---	3	30	-	---	1	12	--	---	--	---	-	---	1	4	3	8
Personal/Chance	42	78	2	33	4	40	7	78	1	12	8	67	13	68	-	---	11	41	28	72
Proximity-Parent	2	4	-	---	--	---	-	---	-	---	--	---	--	---	-	---	--	---	1	3
Government incentives	--	---	2	33	--	---	-	---	1	12	1	8	--	---	-	---	1	4	--	---
Favorable Economy	8	15	1	17	--	---	2	22	-	---	1	8	2	10	-	---	9	33	4	10
R & D	--	---	-	---	--	---	-	---	1	12	1	8	1	5	-	---	3	11	1	3
Resources/Labour	--	---	-	---	--	---	-	---	4	50	--	---	--	---	-	---	--	---	--	---
Transport	1	2	1	17	1	10	-	---	-	---	1	8	3	16	-	---	2	7	2	5
Plant site	1	2	-	---	2	20	-	---	-	---	--	---	--	---	-	---	--	---	--	---
N/A	--	---	-	---	--	---	-	---	-	---	--	---	--	---	-	---	--	---	--	---
TOTAL	54	100	6	100	10	100	9	100	8	100	12	100	19	100	-	---	28	100	39	100

TABLE 22

Head Office of Parent Companies
(Groups of Centres)

LOCATION	ALL FIRMS #	ALL FIRMS %	MLBPR #	MLBPR %	WRSEC #	WRSEC %
Alberta	13	23	2	4	11	7
Saskatchewan	2	4	1	2	1	1
Manitoba	4	7	1	2	3	2
B.C.	3	5	--	---	3	2
Quebec	12	21	1	2	11	7
Ontario	4	7	1	2	3	2
U.S.A.	14	25	2	4	12	8
Europe	3	5	1	2	2	1
Australia	1	2	--	---	1	1
N/A	--	---	36	80	105	69
TOTAL	56	100	45	100	152	100

TABLE 23

Type of Industry - Initially Chosen by Entrepreneurs

	ALL FIRMS		WEC		RS		MLBPR		WRSEC	
SIC*	#	%	#	%	#	%	#	%	#	%
3449	5	3	-	-	1	3	4	9	1	1
3471	1	1	-	-	1	3	-	-	1	1
3493	1	1	1	1	-	-	-	-	1	1
3498	1	1	1	1	-	-	-	-	1	1
3499	2	1	2	2	-	-	-	-	2	1
3511	1	1	1	1	-	-	-	-	1	1
3523	23	12	6	5	10	32	7	16	16	11
3531	2	1	1	1	1	3	-	-	2	1
3532	4	2	-	-	4	13	-	-	4	3
3533	20	10	20	17	-	-	-	-	20	13
3534	1	1	-	-	1	3	-	-	1	1
3536	1	1	1	1	-	-	-	-	1	1
3537	3	2	1	1	1	3	1	2	2	1
3539	1	1	1	1	-	-	-	-	1	1
3544	3	2	1	1	-	-	-	-	3	2
3545	2	1	1	1	1	3	-	-	2	1
3549	1	1	-	-	-	-	1	2	-	-
3551	1	1	1	1	-	-	-	-	1	1
3554	2	1	1	1	1	3	-	-	2	1
3555	1	1	1	1	-	-	-	-	1	1
3559	2	1	2	2	-	-	-	-	2	1
3561	2	1	-	-	1	3	1	2	1	1
3566	2	1	-	-	2	6	-	-	2	1
3573	1	1	1	1	-	-	-	-	1	1
3574	2	1	2	2	-	-	-	-	2	1
3585	3	2	3	2	-	-	-	-	3	2
3599	2	1	2	2	-	-	-	-	2	1
3612	1	1	-	-	-	-	1	2	-	-
3613	1	1	1	1	-	-	-	-	1	1
3622	1	1	-	-	-	-	1	2	-	-

* See Appendix F for the interpretation of the SIC codes. Four-digit SICs are very detailed.

TABLE 23 (continued)

Type of Industry - Initially Chosen by Entrepreneurs

	ALL FIRMS		WEC		RS		MLBPR		WRSEC	
SIC	#	%	#	%	#	%	#	%	#	%
3634	1	1	1	1	-	-	-	-	1	1
3643	1	1	1	1	-	-	-	-	1	1
3661	2	1	2	2	-	-	-	-	2	1
3662	3	2	3	2	-	-	-	-	3	2
3674	1	1	1	1	-	-	-	-	1	1
3679	1	1	1	1	-	-	-	-	1	1
3699	1	1	-	-	-	-	1	2	-	-
3713	4	2	3	2	1	3	-	-	4	3
3714	2	1	2	2	-	-	-	-	2	1
3715	2	1	-	-	-	-	2	4	-	-
3792	1	1	1	1	-	-	-	-	1	1
3795	1	1	-	-	1	3	-	-	1	1
3799	2	1	2	2	-	-	-	-	2	1
3811	2	1	1	1	-	-	1	2	1	1
3823	2	1	-	-	2	6	-	-	2	1
3841	2	1	2	2	-	-	-	-	2	1
3949	1	1	1	1	-	-	-	-	1	1
3993	2	1	2	2	-	-	-	-	2	1

TABLE 24

Motives Underlying Company Growth

(a) All the Companies

	1 NOT IMPORTANT		2		3 MODERATELY IMPORTANT		4		5 HIGHLY IMPORTANT		# of Resp. Firms	M	%
Motives	#	%	#	%	#	%	#	%	#	%			
To make a profit	1	1			20	10	27	14	149	76	197	---	--
To provide a good product	1	1			6	3	16	8	174	88	"	---	--
To grow	2	1	14	7	80	41	43	22	58	29	"	---	--
To run the company	113	57	3	2	28	14	16	8	37	19	"	---	--
To develop the company			9	5	62	32	58	29	68	35	"	---	--
To meet or stay ahead of competition	3	2	3	2	37	19	40	20	114	58	"	---	--
To pay dividends to the stockholders	26	13	35	18	77	39	27	14	32	16	"	---	--
To survive	4	2	5	3	33	17	26	13	129	66	"	---	--
To generate research & development activities	24	12	48	24	64	33	30	15	31	16	"	---	--
Other: Personal/community satisfaction					2	1	3	2	31	16	36	161	82

TABLE 24 (continued)

Motives Underlying Company Growth

(d) MLBPR Firms

	1 NOT IMPORTANT #	%	2 #	%	3 MODERATELY IMPORTANT #	%	4 #	%	5 HIGHLY IMPORTANT #	%	# of Resp. Firms	M	%
Motives													
To make a profit					4	9	5	11	36	80	45	--	100
To provide a good product							4	9	41	91	"	--	"
To grow			5	11	21	47	9	20	10	22	"	--	"
To run the company	25	56	1	2	7	16	6	13	6	13	"	--	"
To develop the company			2	4	19	42	14	31	10	22	"	--	"
To meet or stay ahead of competition			2	4	12	27	5	11	26	58	"	--	"
To pay dividends to the stockholders	6	13	6	13	16	36	9	20	8	18	"	--	"
To survive	1	2	2	4	8	18	3	7	31	69	"	--	"
To generate research & development activities	6	13	10	22	15	33	9	20	5	11	"	--	"
Other									5	18	5	37	100

TABLE 24 (continued)

Motives Underlying Company Growth

(e) WRSEC Firms

	1 NOT IMPORTANT		2		3 MODERATELY IMPORTANT		4		5 HIGHLY IMPORTANT		# of Resp. Firms		
	#	%	#	%	#	%	#	%	#	%		M	%
Motives													
To make a profit	1	1			16	11	22	14	113	74	152	---	100
To provide a good product	1	1			6	4	12	8	133	88	"	---	"
To grow	2	1	9	6	59	39	34	22	48	32	"	---	"
To run the company	88	58	2	1	21	14	10	7	31	20	"	---	"
To develop the company			7	5	43	28	44	29	58	38	"	---	"
To meet or stay ahead of competition	3	2	1	1	25	16	35	23	88	58	"	---	"
To pay dividends to the stockholders	20	13	29	19	61	40	18	12	24	16	"	---	"
To survive	3	2	3	2	25	16	23	15	98	64	"	---	"
To generate research & development activities	18	12	38	25	49	32	21	14	26	17	"	---	"
Other					2	1	3	2	23	15		724	100

TABLE 25

Number of Strategies for Growth

(a) All the Firms

Type of Strategies	Number of Strategies 1	2	3	4	5	6
Distributor initially	57	--	--	--	--	--
Still distributing	9	6	--	--	--	--
Diversification - related products	123	58	6	--	--	--
Diversification - unrelated products		73	31	3	--	--
Diversification - geographical	7	49	99	32	2	--
Merger		2	16	32	5	1
Modernization		4	17	36	26	1
Creation of Divisions	1		4	28	27	7
New Company			4	9	23	7
Branch Plants		2	4	7	14	40
	197 FIRMS	194 FIRMS	181 FIRMS	147 FIRMS	97 FIRMS	56 FIRMS

TABLE 25 (continued)

Number of Strategies for Growth

(b) Moose Jaw, Lethbridge, Brandon, Prince Albert, Red Deer

	1		2		3		4		5		6	
	#	%	#	%	#	%	#	%	#	%	#	%
Distributor initially	15	33	--	--			--	--				
Still Distributing	2	4	2	4			--	--				
Diversification - related products	28	62	15	33			--	--				
Diversification - unrelated products			19	42			--	--				
Diversification - geographical			9	20	25	56	11	24				
Merger					2	4	5	11	1	2		
Modernization					4	9	8	18	8	18	1	2
Creation of Divisions					--	--	6	13	6	13	2	4
New Company					--	--	3	7	4	9	3	7
Branch Plants					--	--	2	4	1	2	6	13
N/A					3	7	10	22	25	56	33	73
Total	45											

TABLE 25 (continued)

Number of Strategies for Growth

(c) Winnipeg, Regina, Saskatoon, Edmonton, Calgary

	1		2		3		4		5		6	
	#	%	#	%	#	%	#	%	#	%	#	%
Distributor initially	42	28										
Still distributing	7	5	4	3								
Diversification - related products	95	63	43	28	4	3						
Diversification - unrelated products	--	--	54	36	22	14	3	2				
Diversification - geographical	7	5	40	26	74	49	21	14	2	1		
Merger	--	--	2	1	14	9	27	18	4	3	1	1
Modernization	--	--	4	3	13	9	28	18	18	12		
Creation of Divisions	1	1	--	--	4	3	22	14	21	14	5	3
New Company			--	--	4	3	6	4	19	13	4	3
Branch Plants			2	1	4	3	5	3	13	9	34	22
N/A			3	2	13	9	40	26	75	49	108	71
Total	152											

Interpretation Codes for TABLE 26

Actual Combinations of the Strategies

0	Distributor initially - decreasing
1	Wholly manufacturer initially - distributorship increasing
2	Diversification - output - related lines
3	Diversification - other industries - unrelated lines
4	Diversification - geographical - new markets - same products
5	Merger - Acquisition
6	Modernization
7	Creation of Divisions within the company
8	Creation of New Companies (Joint venture often vertically integrated)
9	Establishment of Branch Plants

TABLE 26

Actual Combinations of the Strategies

All Firms

One Strategy		Two Strategies		Three Strategies		Four Strategies		Five Strategies		Six Strategies	
Code	# of Firms	Code	# of Firms	Code	# of Firms	Code	# of Firms	Code	# of Firms	Code	# of Firms
4	3	24	8	023	1	0124	2	01234	1	012345	1
		25	1	024	3	0234	3	02345	1	012468	1
		26	2	123	1	0245	1	02346	5	012478	1
		49	1	124	1	0246	1	02348	1	023456	1
		79	1	146	1	0248	2	02349	1	023457	1
				234	9	0249	2	02456	1	023459	2
				245	2	1246	1	02457	1	023467	1
				246	7	1468	1	02459	1	023468	1
				248	4	2345	1	02467	1	023469	1
				249	3	2347	5	02468	1	023479	3
				459	1	2348	5	02479	1	023489	3
				467	1	2349	3	12346	1	023789	1
						2456	2	23456	2	024567	2
						2457	5	23457	1	024568	1
						2467	3	23458	2	024569	1
						2479	1	23468	1	024579	2
						4679	1	23478	2	024678	1
								23479	3	024679	1
								24569	2	024689	2
								24578	1	123469	1
								24679	3	123479	1
								24789	1	123489	1
										234567	3
										234568	1
										234569	4
										234579	4
										234679	2
										234689	1
										234789	2
										236789	1
										245679	3
										245689	1
										246789	1
Total # of Firms	3		13		34		50		41		56

TABLE 26 (continued)

Actual Combinations of Strategies

WRSEC Firms

One		Two		Three		Four		Five		Six	
Code	# of Firms	Code	# of Firms	Code	# of Firms	Code	# of Firms	Code	# of Firms	Code	# of Firms
4	3	24	5	023	1	0124	2	01234	1	012345	1
		25	1	024	2	0234	1	02345	1	023457	1
		26	2	123	1	0245	1	02346	1	023459	1
		49	1	146	1	0248	2	02348	1	023468	1
		79	1	234	6	0249	1	02349	1	023469	1
				245	2	1246	1	02456	1	023479	3
				246	5	1468	1	02457	1	023489	3
				248	4	2345	1	02459	1	023789	1
				249	3	2346	9	02467	1	024567	2
				459	1	2347	2	02468	1	024568	1
				467	1	2348	2	12346	1	024569	1
						2349	2	23456	2	024579	2
						2456	1	23457	1	024679	1
						2457	5	23458	1	024689	2
						2467	2	23459	2	123469	1
						2479	1	23467	4	123489	1
						4679	1	23478	2	234567	2
								23479	3	234568	1
								24569	2	234569	3
								24578	1	234579	3
								24679	3	234589	1
								24789	1	234678	1
										234679	2
										234689	1
										234789	2
										236789	1
										245679	2
										245689	1
Total # of Firms	3		10		27		35		33		43

TABLE 26 (continued)

Actual Combinations of the Strategies

MLBPR Firms

One		Two		Three		Four		Five		Six	
Code	# of Firms	Code	# of Firms	Code	# of Firms	Code	# of Firms	Code	# of Firms	Code	# of Firms
-	-	24	3	024	1	0234	2	02346	4	012468	1
				124	1	0246	1	02479	1	012479	1
				234	3	0249	1	23458	1	023456	1
				246	2	2346	2	23467	1	023467	1
						2347	3	23468	1	024678	1
						2348	3			123479	1
						2349	1			234567	1
						2456	1			234569	1
						2467	1			234579	1
										234589	1
										245679	1
										246789	1
Total # of Firms			3		7		15		8		12

TABLE 27

Multiple Response Analysis on the Growth Strategies

All Firms

Strategies	#	R* %	CAS** %
Distributor initially	58	7	29
Still distributing	15	2	8
Diversification - related product	187	21	95
Diversification - unrelated product	106	12	54
Diversification - geographical	109	22	96
Merger	56	6	28
Modernization	84	10	43
Divisions	67	8	34
New Company	43	5	22
Branch Plant	67	8	34

* Respondents
** Cases

TABLE 27 (continued)

Multiple Response Analysis on the Growth Strategies

	WEC			RS			MLBPR			WRSEC		
	RESCAS			RESCAS			RESCAS			RESCAS		
	#	%	%	#	%	%	#	%	%	#	%	%
Distributor initially	33	6	27	10	7	32	15	8	33	43	6	28
Still distributing	8	2	7	3	2	10	4	2	9	11	2	7
Diversification - related products	111	21	92	31	22	100	45	23	100	142	21	93
Diversification - unrelated products	56	10	46	22	16	71	28	14	62	78	12	51
Diversification - geographical	115	22	95	29	21	94	45	23	100	144	21	95
Merger	39	7	32	9	6	29	8	4	18	48	7	32
Modernization	50	9	41	13	9	42	21	11	47	63	9	41
Divisions	46	9	38	7	5	23	14	7	31	53	8	35
New Company	25	5	21	8	6	26	10	5	22	33	5	22
Branch Plant	50	9	41	8	6	26	9	4	20	58	9	38

TABLE 28

Type of Industry (Secondary-including non-manufacturing)

All Firms

SIC = Code	Absolute Freq	Adjusted Freq (PCT)
1389.	2	1.3
1531.	1	0.6
1796.	1	0.6
1799.	2	1.3
2295.	1	0.6
2394.	1	0.6
2399.	1	0.6
2426.	1	0.6
2448.	1	0.6
2452.	1	0.6
2648.	1	0.6
2654.	1	0.6
2753.	1	0.6
2842.	1	0.6
2879.	1	0.6
2899.	2	1.3
3041.	2	1.3
3069.	1	0.6
3079.	4	2.5
3433.	3	1.9
3441.	7	4.4
3442.	1	0.6
3443.	3	1.9
3444.	1	0.6
3446.	1	0.6
3448.	1	0.6
3449.	7	4.4
3452.	1	0.6
3471.	1	0.6
3479.	3	1.9
3494.	1	0.6
3496.	1	0.6
3498.	1	0.6
3499.	6	3.8
3523.	5	3.2
3524.	1	0.6
3532.	3	1.9
3533.	5	3.2
3535.	3	1.9
3536.	3	1.9
3537.	7	4.4
3541.	1	0.6

TABLE 28a

Secondary Manufacturing Industry

SIC*	Absolute Freq	Adjusted Freq (PCT)	SIC	Absolute Freq	Adjusted Freq (PCT)
2295.	1	0.9	3563.	1	0.9
2329.	1	0.9	3565.	1	0.9
2391.	1	0.9	3566.	1	0.9
2392.	1	0.9	3576.	1	0.9
2394.	1	0.9	3579.	1	0.9
2411.	1	0.9	3585.	1	0.9
2439.	2	1.9	3599.	4	3.7
2448.	1	0.9	3613.	1	0.9
2452.	1	0.9	3634.	1	0.9
2472.	1	0.9	3644.	1	0.9
2643.	1	0.9	3646.	1	0.9
2842.	1	0.9	3711.	2	1.9
2874.	1	0.9	3713.	2	1.9
2899.	1	0.9	3714.	2	1.9
3079.	3	2.8	3715.	1	0.9
3361.	1	0.9	3724.	1	0.9
3398.	1	0.9	3799.	1	0.9
3411.	1	0.9	3811.	1	0.9
3423.	1	0.9	3823.	1	0.9
3433.	1	0.9	3841.	1	0.9
3441.	4	3.7	3949.	2	1.9
3443.	2	1.9	3993.	2	1.9
3444.	3	2.8	9000.	1	0.9
3446.	1	0.9	N/A	90	Missing
3449.	1	0.9			
3452.	1	0.9	TOTAL	197	100.0
3462.	1	0.9			
3465.	1	0.9			
3469.	1	0.9			
3471.	2	1.9			
3494.	5	4.7	VALID CASES	107	
3496.	1	0.9			
3498.	1	0.9			
3499.	2	1.9			
3519.	1	0.9			
3523.	4	3.7			
3531.	5	4.7			
3532.	1	0.9			
3533.	7	6.5			
3535.	2	1.9			
3536.	3	2.8			
3537.	2	1.9			
3546.	1	0.9			
3561.	1	0.9			

* See Appendix E

TABLE 28 (continued)

Type of Industry
(Secondary-including non-manufacturing)

All Firms

SIC[*] = Code	Absolute Freq	Adjusted Freq (PCT)	SIC = Code	Absolute Freq	Adjusted Freq (PCT)
3544.	4	2.5	3795.	3	1.9
3545.	1	0.6	3811.	1	0.6
3546.	1	0.6	3949.	1	0.6
3549.	1	0.6	3993.	1	0.6
3551.	1	0.6	3999.	1	0.6
3555.	1	0.6	5051.	1	0.6
3559.	1	0.6	5065.	1	0.6
3561.	2	1.3	5082.	1	0.6
3563.	3	1.9	5083.	2	1.3
3564.	1	0.6	5084.	2	1.3
3566.	1	0.6	5211.	2	1.3
3573.	1	0.6	6793.	1	0.6
3589.	1	0.6	6990.	1	0.6
3598.	1	0.6	7372.	1	0.6
3646.	1	0.6	7391.	2	1.3
3679.	2	1.3	7392.	1	0.6
3713.	3	1.9	7394.	4	2.5
3714.	1	0.6	7623.	1	0.6
3715.	2	1.3	7692.	1	0.6
3728.	2	1.3	8911.	1	0.6
3732.	1	0.6	-9.	39	---
3792.	5	3.2			
			TOTAL	197	100.0

VALID CASES 158 MISSING CASES 39

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[*] See Appendix E

TABLE 29

Industry Changes by Firms

	YEAR									
TOTAL NUMBER OF SICS	1970		1972		1974		1976		1978	
	#	%	#	%	#	%	#	%	#	%
1	39	42	59	45	65	41	64	38	71	40
2	20	21	33	26	45	28	53	31	44	25
3	13	14	21	16	29	18	25	15	31	18
4	12	13	10	8	14	9	18	10	20	11
5	5	5	5	4	4	3	7	4	8	5
6	2	2	1	1	1	1	1	1	2	1
7	1	1	1	1	1	1	1	1	---	---
8	--	---	---	---	---	---	---	---	---	---
9	2	2	---	---	---	---	1	1	1	1
TOTAL	94	100	130	100	159	100	170	100	177	100

TABLE 30a

Principal Industry Diversification - Changes from 1970-78
Standard Industrial Classification (# of Firms in SIC)

A The Same Industrial Sector Throughout the Period

Centre	SIC 34	SIC 35	SIC 36	SIC 24	SIC 29	SIC 30	SIC 33	SIC 37	SIC 38	SIC 39
Winnipeg	7	10	2	3		6	1	2	1	
Moose Jaw	1			1						
Lethbridge	-	6					1	1		
Brandon	1	3			1			1		
Prince Albert	-	2	1	3	1		1			
Regina	-	7						3		
Saskatoon	4	6								
Red Deer	3	4	1			2			1	
Edmonton	1	8	2		2	5				1
Calgary	6	9	1		2	4	1	1		2

TABLE 30b (continued)

Principal Industry Diversification - Changes from 1970-78

Standard Industrial Classification (# of Firms in SIC)

B Different Industrial Sector, but within the Same Industry

Centre	SIC 34	SIC 35	SIC 36	SIC 24	SIC 29	SIC 30	SIC 33	SIC 37	SIC 38	SIC 39
Winnipeg	2	4	1			1	1	1		
Moose Jaw					2					
Lethbridge										
Brandon	2			1						
Prince Albert										
Regina		2								
Saskatoon		3	1							
Red Deer										
Edmonton		2	1							
Calgary	1	3				1				

TABLE 30c (continued)

Principal Industry Diversification - Changes from 1970-78

Standard Industrial Classification (# of Firms in SIC)

C From One Industry to Another											
Centre	34-25	34-33	34-36	35-34	35-30	38-36	32-35	30-37	30-25	33-35	37-35
Winnipeg	4	1		1	2	1	1	1	2	1	1
Moose Jaw		1								1	
Lethbridge	2										
Brandon			1								
Prince Albert											
Regina				2							1
Saskatoon	1			1		1					1
Red Deer	1										2
Edmonton	4			1							2
Calgary	2										1

TABLE 31

Market Areas of Firms

	ALL FIRMS		WEC		RS		MLBPR		WRSEC	
	#	%	#	%	#	%	#	%	#	%
Local	37	19	20	17	7	23	10	22	27	18
Regional	72	37	41	34	8	26	23	51	49	32
National	43	22	28	23	8	26	7	16	36	24
International	45	23	32	26	8	26	5	11	40	26

TABLE 32

Hierarchy of Market Area (Western Canada)

HIERARCHY					ALL FIRMS		WEC		RS		MLBPR		WRSEC	
1	2	3	4	5	#	%	#	%	#	%	#	%	#	%
Alta.,	B.C.,	Sask.,	Man.,	North	63	32	51	42	--	--	12	27	51	34
Man.,	Sask.,	Alta.,	B.C.,	North	45	23	31	26	5	16	8	18	37	25
Sask.,	Alta.,	Man.,	B.C.,	North	23	12	--	--	16	52	7	16	16	11
Alta.					24	12	14	12	--	--	10	22	14	9
Sask.					14	17	--	--	8	26	6	13	8	5
Man.					17	9	14	12	2	6	1	2	16	11

N.B. 1 most important

TABLE 33

Actual Market Area Combinations

All Firms

Category Label	Absolute Freq	Relative Freq (PCT)
Local and Alberta	13	6.6
Local and Saskatchewan	12	6.1
Local and Manitoba	12	6.1
Regional, Alberta (first plus 3 other western provinces)	25	12.7
Regional, Manitoba (first plus 3 other western provinces)	23	11.7
Regional, Saskatchewan (first plus 3 other western provinces)	7	3.6
Regional, Alberta mostly	11	5.6
Regional, Saskatchewan mostly	2	1.0
Regional, Manitoba mostly	4	2.0

Continued on next page

TABLE 33 (continued)

Actual Market Area Combinations

All Firms

Category Label	Absolute Freq	Relative Freq (PCT)
National	3	1.5
National, emphasis on Alberta (first plus 3 other western provinces)	17	8.6
National, emphasis on Manitoba (first plus 3 other western provinces)	13	6.6
National, emphasis on Saskatchewan (first plus 3 other western provinces)	9	4.6
National, emphasis on Manitoba	1	0.5
International	8	4.1
International and Regional	4	2.0
International, emphasis on Alberta (first plus 3 other western provinces)	21	10.7
International, emphasis on Manitoba (first plus 3 other western provinces)	5	2.5
International, emphasis on Saskatchewan (first plus 3 other western provinces)	7	3.6
TOTAL	197	100.0

VALID CASES 197 MISSING CASES 0

TABLE 34

Potential Revenue Activities Searched by Firms

	ALL FIRMS		WEC		RS		MLBPR		WRSEC	
	#	%	#	%	#	%	#	%	#	%
Yes - No Specific Answer	48	24	34	28	6	19	8	18	40	26
No	9	5	5	4	1	3	3	7	6	4
New Markets - Exports	63	32	38	31	13	42	12	27	51	34
Acquisition	5	2	3	2	1	3	1	2	4	3
New Markets in Canada	17	9	11	9	2	6	4	9	13	9
Holding Company	2	1	2	2	--	--	--	--	2	1
Through Independent Distribution	9	5	5	4	1	3	3	7	6	4
Distributing Other Manufacturers' Products	11	6	4	3	4	13	3	7	8	5
Patent Searchers	11	6	8	7	--	--	3	7	8	5
No - At Capacity	21	11	10	8	3	10	8	18	13	9
N/A	1	1	1	1	--	--	--	--	1	1

TABLE 35

Number of Product Lines (1979)

# OF PRODUCT LINES	ALL FIRMS		WEC		RS		MLBPR		WRSEC	
	#	%	#	%	#	%	#	%	#	%
1	17	9	13	11	--	---	4	9	13	9
2	20	10	12	10	2	6	6	13	14	9
3	42	21	24	20	6	19	12	27	30	20
4	18	9	10	8	3	10	5	11	13	9
5	13	7	5	4	6	19	2	4	11	7
6	10	5	8	7	2	6	--	---	10	7
7	1	1	---	---	1	3	--	---	1	1
8	2	1	2	2	--	---	--	---	2	1
Over 8	72	37	46	38	11	35	15	33	57	38
N/A	2	1	1	1	--	---	1	2	1	1
TOTAL	197	100	121	100	31	100	45	100	152	100

TABLE 36

Details of Changes in the Product Lines

	Absolute Freq	(PCT)
1-3 products added and deleted	14	8.5
4-6 products added and deleted	8	4.8
1-3 products added	61	37.0
4-6 products added	28	17.0
7-9 products added	35	21.2
Different models of same products added	15	9.1
1-3 products deleted	4	2.4
N/A	32	---
TOTAL	197	100.0

VALID CASES 165 MISSING CASES 32

TABLE 37

Changes in Product Lines

(All Firms)

	Absolute Freq	(PCT)
Additions	141	75.8
Deletions	26	14.0
Additions and Deletions	19	10.2
N/A	11	---
TOTAL	197	100.0

VALID CASES 186 MISSING CASES 11

TABLE 38

Multiple Response Analysis of Company Structure

ALL FIRMS

FUNCTIONS	1*			2*			3*			4*			5*		
		RES+	CAS+		RES	CAS		RES	CAS		RES	CAS		RES	CAS
	#	%	%	#	%	%	#	%	%	#	%	%	#	%	%
Sales	170	74	89	17	7	9	32	14	17	3	1	2	9	4	5
Pricing	183	86	92	16	8	8	14	6	7	---	--	--	1	1	1
Loans	160	79	81	40	20	20	2	1	1	---	--	--	1	1	1
Investment	177	86	90	28	14	14	---	--	--	1	1	1	1	1	1
Budget	153	74	78	49	24	25	4	2	2	---	--	--	1	1	1
Management	168	76	85	22	10	11	12	6	6	16	7	8	2	1	1
Legal	34	16	17	37	18	19	1	1	1	137	66	70	-	-	-
Market Coverage	187	80	95	2	1	1	36	15	18	7	3	4	3	1	2
Executive Hiring	178	86	91	26	13	13	1	1	1	1	1	1	-	-	-
Wage	180	86	91	27	13	14	1	1	1	---	--	--	-	-	-
Public Relations	189	87	96	14	6	7	15	7	8	---	--	--	-	-	-
Maintenance	191	85	97	1	0	1	30	13	15	2	1	1	1	0	1
Design/Packaging	185	83	94	18	8	9	12	5	6	7	3	4	2	1	1
Storage	148	70	86	5	2	3	37	17	21	14	7	8	9	4	5
Transport-Materials	150	62	76	7	3	4	23	9	12	62	25	32	2	1	1
Transport-Finished goods	150	61	76	5	2	2	26	11	13	62	25	32	2	1	1
Accounting	183	87	93	12	6	6	4	2	2	10	5	5	2	1	1

* 1 = At the main location of the firm.
2 = Through parent.
3 = Through subsidiary operations.
4 = From independent companies.
5 = Other

+RES = % of Responses
+CAS = % of Cases

TABLE 38 (continued)

Multiple Response Analysis of Company Structure

FUNCTIONS	MLBPR														
	1			2			3			4			5		
		RES	CAS		RES	CAS		RES	CAS		RES	CAS		RES	CAS
	#	%	%	#	%	%	#	%	%	#	%	%	#	%	%
Sales	37	74	88	4	8	10	7	14	17	--	--	--	2	4	5
Pricing	39	81	87	5	10	11	3	6	7	--	--	--	1	2	2
Loans	37	80	82	9	20	20	-	--	--	--	--	--	-	-	--
Investment	41	84	91	7	14	16	-	--	--	1	2	2	-	-	--
Budget	38	83	84	8	17	18	-	--	--	--	--	--	-	-	--
Management	34	68	76	4	8	9	3	6	7	8	16	18	1	2	2
Legal	4	8	9	6	12	13	-	--	--	38	79	84	-	-	--
Market Coverage	42	82	93	2	4	4	7	14	16	--	--	--	-	-	--
Executive Hiring	40	85	89	7	15	16	-	--	--	--	--	--	-	-	--
Wage	39	85	87	7	15	16	-	--	--	--	--	--	-	-	--
Public Relations	43	86	96	3	6	7	4	8	9	--	--	--	-	-	--
Maintenance	45	90	100	-	--	--	5	10	11	--	--	--	-	-	--
Design/Packaging	43	86	96	4	8	9	2	4	4	--	--	--	1	2	2
Storage	34	71	87	2	4	5	6	12	15	2	4	5	4	8	10
Transport-Materials	34	65	76	2	4	4	3	6	7	13	25	29	-	-	--
Transport-Finished goods	33	62	73	2	4	4	3	6	7	14	26	31	1	2	2
Accounting	40	85	89	3	6	7	2	4	4	2	4	4	-	-	--

TABLE 38 (continued)

Multiple Response Analysis of Company Structure

	WRSEC														
	1			2			3			4			5		
FUNCTIONS		RES	CAS		RES	CAS		RES	CAS		RES	CAS		RES	CAS
	#	%	%	#	%	%	#	%	%	#	%	%	#	%	%
Sales	133	74	89	13	7	9	25	14	17	3	2	2	7	4	5
Pricing	144	87	95	11	7	7	11	7	7	--	--	--	-	-	-
Loans	123	78	81	31	20	20	2	1	1	--	--	--	1	1	1
Investment	136	86	90	21	13	14	--	--	--	--	--	--	1	1	1
Budget	115	71	76	41	26	27	4	2	3	--	--	--	1	1	1
Management	134	79	88	18	11	12	9	5	6	8	5	5	1	1	1
Legal	30	19	20	31	19	20	1	1	1	99	62	65	-	-	-
Market Coverage	145	79	95	--	--	--	29	16	19	7	4	5	3	2	2
Executive Hiring	138	87	91	19	12	13	1	1	1	1	1	1	-	-	-
Wage	141	87	93	20	12	13	1	1	1	--	--	--	-	-	-
Public Relations	146	87	96	11	6	7	11	6	7	--	--	--	-	-	-
Maintenance	146	83	96	1	1	1	25	14	16	2	1	1	1	1	1
Design/Packaging	142	82	94	14	8	9	10	6	7	7	4	5	1	1	1
Storage	114	69	85	3	2	2	31	19	23	12	7	9	5	3	4
Transport-Materials	116	60	76	5	3	3	20	10	13	49	26	32	2	1	1
Transport-Finished goods	117	61	77	3	2	2	23	12	15	48	25	32	1	1	1
Accounting	143	87	95	9	6	6	2	1	1	8	5	5	2	1	1

TABLE 39

Characteristics of Subsidiary Operations

(a) All Firms

Name of Company	# of Firms	%	# of Plants #	# of Firms	%	Location of Plants	#	%	Function of Plant	#	%
0) Same as surveyed firm	70	81	1	46	53	0) Alberta	28	33	0) Branch Office	31	35
1) Different name	12	14	2	19	22	1) Saskatchewan	11	13	1) Plant	13	15
2) Both	5	6	3	6	7	2) Manitoba	7	8	2) Warehouse	1	1
Total	87	100	4	6	7	3) Other Canada	7	8	3) Office/Plant/Distribution	19	22
			5	5	6	4) Same Province & USA	3	4	4) Office/Plant/Warehouse	8	9
			6	3	3	5) Same City & USA	--	--	5) Associate Company	5	6
			7	1	1	6) Canada & USA	3	4	6) Plant/Sales (separate)	5	6
			9	1	1	7) USA	8	9	7) Distribution	2	2
			Total	87	100	8) Europe	4	5	8) Associate Company & any of the above	4	5
						9) Canada & Relevant Province	15	17			

TABLE 39 (continued)

Characteristics of Subsidiary Operations

(a) All Firms

	Year Established				% of Control			Type of Industry			Type of Industry		
		#	%		%	#	%	SIC	#	%	SIC	#	%
0)	Before 1900	1	1	0)	>50	86	99	0191	1	0.5	3715	2	1.0
1)	1900-1920	--	--	1)	<50	1	1	1731	1	0.5	3764	1	0.5
2)	1921-1940	3	3					2034	1	0.5	3799	1	0.5
3)	1941-1950	1	1					2421	1	0.5	3811	1	0.5
4)	1951-1960	2	2					2452	1	0.5	3993	1	0.5
5)	1961-1970	18	21					2879	1	0.5	5023	1	0.5
6)	1971-1975	20	23					3069	1	0.5	5041	1	0.5
7)	1976 →	31	35					3079	7	3.6	5063	1	0.5
8)	Two periods	6	7					3231	1	0.5	5065	2	1.0
9)	Three periods	6	7					3293	1	0.5	5078	1	0.5
								3412	1	0.5	5081	1	0.5
								3433	1	0.5	5083	4	2.0
								3441	1	0.5	5084	13	6.6
								3444	1	0.5	5085	1	0.5
								3446	1	0.5	5087	1	0.5
								3448	4	2.0	5088	1	0.5
								3449	2	1.0	5099	1	0.5
								3471	1	0.5	5211	1	0.5
								3494	1	0.5	5271	1	0.5
								3498	1	0.5	5399	1	0.5
								3499	1	.05	5943	1	0.5
								3523	1	0.5	7391	2	1.0
								3531	1	0.5	7395	1	0.5
								3533	1	0.5	7699	4	2.0
								3536	1	0.5	8911	1	0.5
								3661	1	0.5	N/A	112	56.9
								3662	1	0.5			
								3714	2	1.0	Total	197	100.0

TABLE 39 (continued)

Characteristics of Subsidiary Operations

(b) WRSEC Firms

Name of Company			# of Plants			Location of Plants			Function of Plants			Year Established			% of Control			Type of Industry			Type of Industry		
	#	%		#	%		#	%		#	%		#	%		#	%	SIC	#	%	SIC	#	%
0)*	59	39	1*	38	25	0)*	23	15	0)*	27	18	0)*	1	1	0)*	73	48	2879	1	1	3811	1	1
1)	10	7	2	18	12	1)	8	5	1)	12	8	1)	--	--	1)	1	1	3069	1	1	3993	1	1
2)	4	3	3	4	3	2)	4	3	2)	--	--	2)	2	1				3079	6	4	5023	1	1
			4	4	3	3)	6	4	3)	16	11	3)	1	1	N/A	78	51	3293	1	1	5041	1	1
N/A	79	52	5	5	3	4)	3	2	4)	5	3	4)	1	1				3412	1	1	5063	1	1
			6	3	2	5)	--	--	5)	4	3	5)	18	12				3441	1	1	5065	2	1
			7	--	--	6)	2	1	6)	4	3	6)	20	13				3446	1	1	5078	1	1
			8	--	--	7)	8	5	7)	2	1	7)	21	14				3448	2	1	5081	1	1
			9 - over 9			8)	4	3	8)	4	3	8)	5	3				3449	2	1	5083	4	3
				1	1	9)	14	9				9)	5	3				3471	1	1	5084	13	9
									N/A	78	51							3494	1	1	5085	1	1
			N/A	79	52	N/A	80	53				N/A	78	51				3498	1	1	5088	1	1
																		3523	1	1	5099	1	1
																		3531	1	1	5271	1	1
																		3533	1	1	5399	1	1
																		3536	1	1	5943	1	1
																		3661	1	1	7391	2	1
																		3662	1	1	7395	1	1
																		3714	2	1	7699	4	3
																		3415	2	1	8911	1	1
																		3764	1	1			
																		3799	1	1	N/A	81	53

*See TABLE 39 (a)

TABLE 39 (continued)

Characteristics of Subsidiary Operations

(e) MLBPR Firms

Name of Company			# of Plants			Location of Plants			Function of Plants			Year Established			% of Control			Type of Industry		
	#	%		#	%		#	%		#	%		#	%		#	%	SIC	#	%
0)*	11	24	1*	8	18	0)*	5	11	0)*	4	9	0)*	--	--	0)*	14	31	191	1	2
1)	2	4	2	1	2	1)	3	7	1)	1	2	1)	--	--	1)	--	--	1731	1	2
2)	1	2	3	2	4	2)	3	7	2)	1	2	2)	1	2				2034	1	2
			4	2	4	3)	1	2	3)	3	7	3)	--	--	M	31	69	2421	1	2
M	31	69	5	--	--	4)	--	--	4)	3	7	4)	1	2				2452	1	2
			6	--	--	5)	--	--	5)	1	2	5)	--	--				3079	1	2
			7	1	2	6)	1	2	6)	1	2	6)	--	--				3231	1	2
			8	--	--	7)	--	--	7)	--	--	7)	10	22				3433	1	2
			9	--	--	8)	--	--	8)	--	--	8)	1	2				3444	1	2
						9)	1	2				9)	1	2				3448	2	4
			M	31	69				M	31	69							3499	1	2
						M	31	69				M	31	69				5087	1	2
																		5211	1	2
																		M	31	69

* See TABLE 39 (a)

TABLE 40

Significant Associations Between the Age of the Surveyed Firms and The Age of their Subsidiaries (Chisquare Test).

	Significance Level %	N
1. All Firms Surveyed firms established between 1941 and 1970 set up their subsidiaries between 1961 and 1970. Also, companies established between 1951 and 1970 set up their subsidiaries between 1971 and 1976.	5%	87
2. Regional Cities (MLBPR) Surveyed firms established between 1961 and 1975 set up their subsidiaries after 1976.	5%	14

TABLE 41

Total Employment - 1979/80
(Groups of Centres)

	ALL FIRMS		WEC		RS		MLBPR		WRSEC	
	#	%	#	%	#	%	#	%	#	%
< 15	63	31	32	26	13	42	17	38	45	30
15 - 49	64	32	37	31	9	29	18	40	46	30
50 - 99	32	16	20	17	4	13	8	18	24	16
100 - 199	22	11	18	15	3	10	1	2	21	14
200 - 499	10	5	8	7	2	6	--	---	10	7
499 - 1,499	7	4	6	5	--	---	1	2	6	4
TOTAL	197	100	121	100	31	100	45	100	152	100

TABLE 41 (continued)

Employment - 1969/70 or 1st Year Company was Established (if after 1969)

(Groups of Centres)

	ALL FIRMS		WEC		RS		MLBPR		WRSEC	
	#	%	#	%	#	%	#	%	#	%
< 15	105	53	58	48	19	61	28	62	77	51
15 - 49	52	26	30	25	8	26	14	31	38	25
50 - 99	20	10	17	14	2	6	1	2	19	13
100 - 199	8	4	6	5	1	3	1	2	7	5
200 - 499	7	4	6	5	1	3	--	---	7	5
500 - 1,499	4	2	4	3	--	---	--	---	4	3
N/A	1	1	---	---	--	---	1	2	---	---
TOTAL	197	100	121	100	31	100	45	100	152	100

TABLE 42

Total
Employment Changes: 1968-78
in Respondent Firms

Centre	Wide* Fluctuations	Rapid* Growth	Steady* Growth	Decline*	No* Change
Winnipeg	17	13	9	7	3
Brandon	2	4	1	1	
Moose Jaw	1	2	2	1	
Prince Albert		3			1
Regina	2	3	2		4
Saskatoon	3	6	3	2	4
Red Deer	1	3	2	1	1
Lethbridge	7	1	2		
Edmonton	4	13	1	1	2
Calgary	13	8	5	4	5

Wide Fluctuations: increases of 50% and over followed by decreases of -80% and under, or decreases of -80% and under followed by increases of 10% and over.

Rapid growth: Continuous increases of 20% and over, no decline during the period.

Steady: Average employment increases of between 2% and 9%, no decline during the period.

No change: no change in the numbers of employees.

TABLE 43

Value of Shipments of own Manufacture (Sales-Gross)
1969/70 or First Year of Company
(Groups of Centres)

	ALL FIRMS		WEC		RS		MLBPR		WRSEC	
$	#	%	#	%	#	%	#	%	#	%
Less than 25,000	19	10	12	10	6	19	1	2	18	12
25,000 - 49,999	16	8	7	6	5	16	4	9	12	8
50,000 - 99,999	21	11	10	8	3	10	8	18	13	9
100,000 - 499,999	55	28	31	26	7	23	17	38	38	25
500,000 - 999,999	28	14	17	14	5	16	6	13	22	14
1m - 4.9 million	37	19	28	23	2	6	7	16	30	20
5 million & over	21	11	16	13	3	10	2	4	19	13
TOTAL	197	100	121	100	31	100	45	100	152	100

TABLE 43 (continued)

Value of Shipments of "Own" Manufacture - 1979/80

	ALL FIRMS		WEC		RS		MLBPR		WRSEC	
$	#	%	#	%	#	%	#	%	#	%
Less than 25,000	---	---	---	---	--	---	--	---	---	---
25,000 - 49,999	---	---	---	---	--	---	--	---	---	---
50,000 - 99,999	5	3	4	3	1	3	--	---	5	3
100,000 - 499,999	35	18	15	12	9	29	11	24	24	16
500,000 - 999,999	28	14	15	12	5	16	8	18	20	13
1m - 4.9 million	70	36	43	36	10	32	17	38	53	35
5 million & over	58	29	44	36	6	19	8	18	50	33
N/A	1	1	---	---	--	---	1	2	---	---
TOTAL	197	100	121	100	31	100	45	100	152	100

TABLE 44

Total
Wages and Salaries Paid in 1979

(Groups of Centres)

	ALL FIRMS		WEC		RS		MLBPR		WRSEC	
$	#	%	#	%	#	%	#	%	#	%
Less than 25,000	---	---	---	---	--	---	--	---	---	---
25,000 - 49,999	5	3	4	3	1	3	--	---	5	3
50,000 - 99,999	16	8	4	3	5	16	7	16	9	6
100,000 - 499,999	95	48	56	46	13	42	26	58	69	45
500,000 - 999,999	35	18	24	20	5	16	6	13	29	19
1m - 4.9 million	35	18	24	20	6	19	5	11	30	20
5 million & over	11	6	9	7	1	3	1	2	10	7
TOTAL	197	100	121	100	31	100	45	100	152	100

TABLE 45

Frequency Distribution of Responses
to Changes in Primary Goal
of Firm

	ALL FIRMS		WEC		RS		MLBPR		WRSEC	
	#	%	#	%	#	%	#	%	#	%
Yes	91	46	61	50	12	39	18	40	73	48
No	104	53	58	48	19	61	27	60	77	51

TABLE 46

Details of Changes in Primary Goal

Changes in Goals	ALL FIRMS		WEC		RS		MLBPR		WRSEC	
	#	%	#	%	#	%	#	%	#	%
Retirement Project	5	2	4	3	1	3	--	--	5	3
Less emphasis on survival more on growth	14	7	11	9	2	6	1	2	13	9
Less emphasis on profit more on survival	10	5	8	7	--	--	2	4	8	5
More emphasis on aggressive marketing	22	11	15	12	4	13	3	7	19	13
More emphasis on manufacturing	9	5	6	5	1	3	2	4	7	5
Less emphasis on community goods	8	4	3	2	--	--	5	11	3	2
More emphasis on survival due to death of owner	4	2	2	2	1	3	1	2	3	2
Less emphasis on running the company	4	2	3	2	1	3	--	--	4	3
Reached a threshold growth not so important	13	7	8	7	1	3	4	9	9	6
Promote local manufacturing	3	2	2	2	1	3	--	--	3	2
N/A	105	53	59	49	19	61	27	60	78	51

TABLE 47

Year When Changes in Primary Goal Occurred

# OF YEARS AFTER FIRM WAS ESTABLISHED	ALL FIRM #	ALL FIRM %	WEC #	WEC %	RS #	RS %	MLBPR #	MLBPR %	WRSEC #	WRSEC %
1 - 5 years	23	12	10	8	8	26	5	11	18	12
6 - 10 years	15	8	11	9	2	6	2	4	13	9
10 - 15 years	11	6	8	7	--	--	3	7	8	5
16 - 20 years	9	5	8	7	1	3	--	--	9	6
21 - 25 years	5	2	5	4	--	--	--	--	5	3
26 - 30 years	4	2	3	2	--	--	1	2	3	2
31 - 35 years	8	4	6	5	1	3	1	2	7	5
36 - 40 years	4	2	--	--	--	--	4	9	--	--
over 40 years	12	6	10	8	--	--	2	4	10	7
N/A	106	54	60	50	19	61	27	60	79	52

TABLE 48

Significant Relationships between the Total Responses to each Strategy+ and the Age of the Firm

		* 1% ** 5%	N
All the Firms			
Six-strategy group/age:	Branch plants 1941-50 1961-70	*	56
WRSEC Firms			
Six-strategy group/age:	Branch plants 1941-50 1961-70	*	44
RS Firms			
Five-strategy group/age:		**	9

+ See TABLE 26

TABLE 49

Summary of the Multiple Response Crosstabulation between Development Phase and Markets

Markets	Predominant Life Cycle Phase of Firms Prairies (All)	Metropolitan Centres	Regional Centres
Local	Young firm/Old product	Young firm/Old product	Young firm/Mature product
Regional	Young firm/Old product	Young firm/Mature product	Young firm/Old product
National	Young firm/Mature product	Young firm/Mature product	Young firm/Mature product
International	Young firm/Mature product	Young firm/Mature product	Young firm/Mature product
Alberta, B.C.	Young firm/Mature product	Young firm/Mature product	Young firm/Mature product
Manitoba, Sask.	Mature firm/Old product	Mature firm/Old product	Mature firm/Old product
Saskatchewan, Alta.	Mature firm/Old product	Mature firm/Old product	Mature firm/Mature product
Alberta only	Young firm/Mature product	Young firm/Mature product	Young firm/Old product
Saskatchewan only	Young firm/Old product	Young firm/Old product	Young firm/Old product
Manitoba only	Mature firm/Old product	Young firm/Old product	Young firm/Old product

TABLE 50

Significant Relationships Between the Responses to each Strategy Within each Category+ and Market Area

		* 1% ** 5%	N
	All the Firms		
1.	One Strategy/Market (Vertical Integration/Regional Market)	*	197
2.	One Strategy/Market (Distribution, Vertical Integration/Alberta group; Vertical Integration/Manitoba group)	*	186
3.	Two Strategy/Market (Vertical Integration, Unrelated output diversification/Alberta group)	*	194
4.	Two Strategy/Market (Vertical Integration, Unrelated output diversification/Alberta group)	*	185
5.	Three Strategy/Market (Geographic diversification/Regional Market)	*	181
6.	Six Strategy/Market (Branch plants/Regional, National & International Markets)	*	56
7.	Six Strategy/Market (Branch plants/All western trading groups)	*	54
	WEC Firms		
1.	One Strategy/Market (Vertical Integration, Distributorship/Local to International Markets)	*	121
2.	One Strategy/Market (Vertical Integration, Distributorship/Alberta and Manitoba trading groups)	*	111
3.	Two Strategy/Market (Diversification measures/Alberta, Manitoba trading groups)	*	108

TABLE 51

Development Phase and Industrial Diversification

Development Phase & Industrial Change*	Number of Firms In									
	WINN	MOOS	LETH	BRAN	PRIN	REGI	SASK	REDD	EDMO	CALG
Mature Firms/ Mature Products in										
A	6	2	3		1		2		3	6
B	2					1				1
C	5	1							3	
Mature Firms/ Old Products in										
A	13	1	3	4	2		2	1	3	4
B	4						1		1	1
C	6		1			1	1		1	3
Young Firms/ Mature Products in										
A	10		2		2	3		5	8	10
B	2			1		1	1		3	1
C	3	2	1	1		1	2		1	3
Young Firms/ Old Products in										
A	2			2	3	4	6	5	2	7
B				1			3		1	2
C	1					1	1	1	2	

* Industrial Change is classified into three divisions:
A = Same industrial sector
B = Different industrial sector but within same industry
C = Different industries

TABLE 52

Significant Correlations between the Age of the Firms and Scale Variables

A	Employment/Period of Firm Establishment (Age)	* 1% ** 5%	N
	All Firms		
(i)	1969/70 Employment/Age (<15 people/1961-1970 firms)	*	197
(ii)	1979/80 Employment/Age (<15 people/1971-75; 15-49 people/1961-70)	*	197
	WEC Firms		
(i)	1969/70 Employment/Age (<15 people to 49 people/1970-75)	*	119
(ii)	1979/80 Employment/Age (<15 people to 49 people/1961-75)	*	119
	RS Firms		
(i)	1969/70 Employment/Age (<15 people/1961-70)	*	31
	MLBPR Firms (Regional Centres)		
(i)	1969/70 Employment/Age (<15 people/1951-76+)	*	43

TABLE 52 (continued)

Significant Correlations between the Age of the Firms and Scale Variables

B	Value of Shipments/Period of Establishment (Age)	* 1% ** 5%	N
	All Firms		
(i)	1979/80 Sales/Age	*	197
	(<$500,000/1961-70 & >$5m/1900-1950)		
(ii)	1969/70 Sales/Age	**	197
	WRSEC Firms		
(i)	1969/70 Sales/Age	*	150
	($500,000/1951-70; $½m - $1m/1961-70 & >$5m/1921-50)		
(ii)	1979/80 Sales/Age	*	150
	($½m/1961-70 & >$5m/1921-1950)		
	WEC Firms		
(i)	1969/70 Sales/Age	**	119
	($½m/1961-70 & >$5m/1921-60)		
(ii)	1979/80 Sales/Age	*	119
	($1m - $5m/1961-70 & >$5m/1900-50)		
RS	- not significant		
MLBPR	- not significant		

TABLE 53

Significant Relationships between Age and Scale Variables (Spearman Rank Correlation)

		ALL FIRMS	WEC	RS	MLBPR	WRSEC
1979 Employment with Age	Rs	-0.4121	-0.4360	-0.4110	-0.2468	-0.4567
	N	194	119	31	44	150
	SIG	1%	1%	1%	5%	1%
1969 Employment with Age	Rs	-0.5313	-0.5249	-0.4854	-0.5601	-0.5287
	N	193	119	31	43	150
	SIG	1%	1%	1%	1%	1%
1979 Wages with Age	Rs	-0.3738	-0.3744	-0.4799	-0.2459	-0.4137
	N	194	119	31	44	150
	SIG	1%	1%	1%	5%	1%
1969 Value of Shipments with Age	Rs	-0.4063	-0.4289	-0.3157	-0.2958	-0.4393
	N	194	119	31	44	150
	SIG	1%	1%	5%	5%	1%
1979 Value of Shipments with Age	Rs	-0.2984	-0.2694	-0.4585	Not significant	-0.3439
	N	193	119	31		150
	SIG	1%	1%	1%		1%
Number of Product Lines with Age	Rs	-0.1612	-0.2016	Not significant	Not significant	-0.1916
	N	192	118			149
	SIG	1%	1%			1%

TABLE 54
Relationship Between Development Phase and Employment Changes

Employment Changes	Mature Firm Mature Product # of Firms	Mature firm Old Product # of Firms	Young Firm Mature Product # of Firms	Young Firm Old Product # of Firms
Winnipeg				
No Change	1	2	0	0
Rapid	1	5	6	1
Steady	3	4	1	1
Decline	2	2	3	0
Wide Fluctuations	5	10	3	1
Moose Jaw				
No Change				
Rapid	1		1	
Steady	1	1		
Decline	1			
Wide Fluctuations			1	
Lethbridge				
No Change				
Rapid	1			
Steady		2		
Decline				
Wide Fluctuations	2	3	2	
Brandon				
No Change				
Rapid			2	2
Steady		1		
Decline				1
Wide Fluctuations		2		
Prince Albert				
No Change				1
Rapid		2		1
Steady				
Decline				
Wide Fluctuations				

TABLE 54 (continued)
Relationship Between
Development Phase and Employment Changes

Employment Changes	Mature Firm Mature Product	Mature Firm Old Product	Young Firm Mature Product	Young Firm Old Product
	# of Firms	# of Firms	# of Firms	# of Firms
Regina				
No Change				4
Rapid	1		2	
Steady		1	1	
Decline				
Wide Fluctuations			2	
Saskatoon				
No Change		1		3
Rapid		1	1	4
Steady	1	1		1
Decline			1	1
Wide Fluctuations	1	1	1	
Red Deer				
No Change				1
Rapid		1		2
Steady				2
Decline			1	
Wide Fluctuations			1	
Edmonton				
No Change	1			1
Rapid	5		7	1
Steady	1			
Decline				1
Wide Fluctuations		2		2
Calgary				
No Change		2	2	1
Rapid	1	1	4	2
Steady	2	1	2	0
Decline			3	1
Wide Fluctuations	4	2	4	3

TABLE 55

Year When Innovation Commenced

	ALL FIRMS		MLBPR		WRSEC	
	#	%	#	%	#	%
1900 - 1920	2	1	1	2	1	1
1921 - 1940	3	2	1	2	2	1
1941 - 1950	2	1	--	--	2	1
1951 - 1960	13	7	1	2	12	8
1961 - 1970	36	18	1	2	35	23
1971 - 1975	31	16	6	13	25	16
After 1975	9	5	2	4	7	5
N/A	101	51	33	73	68	45

TABLE 56

Number of Innovations in Firms

	ALL FIRMS		MLBPR		WRSEC	
	#	%	#	%	#	%
Several, but patents taken out by parent	11	6	4	9	7	5
One innovation	40	20	5	11	35	23
Two innovations	19	10	4	9	15	10
Three innovations	15	8	2	4	13	9
Four innovations	6	3	1	2	5	3
Five innovations	--	--	--	--	--	--
Six innovations	3	2	--	--	3	2
Over six innovations	11	6	--	--	11	7
Built own machinery & prototype	17	9	6	13	11	7
Unpatented innovations	27	14	5	11	22	14
N/A	48	24	18	40	30	20

TABLE 57

Multiple Response Analysis of the Type of Innovations

(All Firms)

	COUNT	PCT OF RESPONSES	PCT OF CASES
Type - 1*	1	0.7	1.0
Type - 2	7	5.2	7.3
Type - 3	38	28.1	39.6
Type - 4	79	58.5	82.3
Type - 5	10	7.4	10.4
Total Responses	135	100.0	140.6
101 Missing Cases	96 Valid Cases		

*

Type 1 - An innovation leading to a completely new technology.

Type 2 - An innovation which makes current technology obsolete.

Type 3 - An innovation which causes major changes in current technology.

Type 4 - An innovation which causes slight changes in current technology.

Type 5 - An innovation which makes no difference to current technology.

TABLE 58

Actual Combinations of the Type of Innovations Mentioned by the Firms

	# OF FIRMS	ADJ FREQ (PCT)
Type 1 & 4*	1	1.0
Type 2 only	1	1.0
Type 2 & 3	6	6.3
Type 3 only	9	9.4
Type 3 & 4	23	24.0
Type 4 only	43	44.8
Type 4 for all the products	3	3.1
Type 4 & 5	6	6.3
Type 5 only	4	4.2
N/A	101	MISSING
Total	197	100.0

Valid Cases 96 Missing Cases 101

* See TABLE 57

TABLE 59

Summary of Multiple Response Crosstabulation between Innovation Types and Development Phase

(a) All the Firms (Prairies)

Innovation Type*	# of Firms	Life Cycle Phase
1	1	Mature firms with mature products
2	7	Young firms with mature products
3	38	Young & mature firms with mature products
4	79	Young & mature firms with mature products
5	10	Mature firms with old products

(b) Metropolitan Centres

1	1	Mature firms with mature products
2	7	Young firms with mature products
3	35	Young & mature firms with mature products
4	68	Young & mature firms with mature products
5	5	Mature firms with old products

(c) Regional Centres

3	3	Mature firms with mature products
4	11	Mature firms with mature products
5	5	Young firms with mature products

* See Table 57

TABLE 60

Sources of Innovation

		ABSOLUTE FREQ	ADJUSTED FREQ (PCT)
Independent Inventors		18	15.0
Employees of the firm	1.	79	65.8
Unknown	2.	6	5.0
Independent Inventors & Employees of the firm	3.	17	14.2
N/A		77	Missing
	TOTAL	197	100.0

Valid Cases 120 Missing Cases 77

TABLE 61

Existence of R & D in the Firm

	ALL FIRMS		MLBPR		WRSEC	
	#	%	#	%	#	%
Yes	144	73	30	67	114	75
No	53	27	15	33	38	25

TABLE 62

R & D Regarded as a Profit Centre

	ALL FIRMS		MLBPR		WRSEC	
	#	%	#	%	#	%
Yes	97	49	24	53	73	48
No	100	51	21	47	79	52

TABLE 63

R & D
Part of General Marketing Policy

	ALL FIRMS		MLBPR		WRSEC	
	#	%	#	%	#	%
Yes	139	71	29	64	110	72
No	58	29	16	36	42	28

TABLE 64

Significant Relationships Between both Patented and Unpatented Innovations and Associated Features .

	* 1% ** 5%	N
All the Firms		
Products on the market for 11-20 years/ One innovation	**	148
Products on the market for 21-30 years/ One or two innovations and unpatented innovations	*	117
WRSEC		
Products on the market for 11-15 years/one innovation	*	122
Products on the market for 16-20 years/one innovation	*	122
Products on the market for 16-20 years/unpatented innovations	*	122
Products on the market for 21-30 years/unpatented innovations	**	95
WEC Firms		
Products on the market for 11-20 years/one innovation	**	100
Products on the market for 31-40 years/one innovation	**	76

TABLE 65

Summary of the Multiple Response Crosstabulation on Innovation and Strategies

	Strategies Most Associated with Innovation in:		
Innovation Type	Prairies	Metropolitan Centres	Regional Centres
From Parents	Vertical Diversification	Vertical Diversification	ALL Diversification Measures
# of Innovations			
1	Geographical Diversification	Geographical Diversification	Vertical & Geographical Diversification
2	Vertical & Geographical Diversification	Vertical & Geographical Diversification	Vertical & Geographical Diversification
3	Vertical & Geographical Diversification	Vertical & Geographical Diversification	Vertical & Geographical Diversification
4	Vertical & Geographical Diversification	Geographical Diversification Branch Plants	All Diversification Measures
6	New Company	Vertical Diversification	——
Over 6	Vertical & Geographical Diversification	Vertical & Geographical Diversification	——
Machinery	Vertical Diversification	Vertical Diversification	Vertical & Geographical Diversification
Unpatented	Geographical Diversification	Geographical Diversification	All Diversification Measures

TABLE 66

Significant Relationships Between the Number of Innovations (patented) and Controlling Variables (including associated features)

	* 1% ** 5%	N
All the Firms		
One innovation/wages paid of between $1/2 and $5 m (3 size categories) and Over six innovations/wages paid = $1 m and over $5 m	*	94
One innovation/1979-80 Sales of over $5 m and Over six innovations/1979-80 Sales of over $5 m	*	94
One and two innovations/Farm implement and metal fabricating industries	*	94
One and two innovations/Products on the market for between 21 and 50 years	**	77
Three innovations/Products on the market for 16-20 years Over six innovations/Products on the market for 11-20 years		
WEC Firms		
Innovation/Wages paid = $100,000-$1/2 m	**	69
Innovation/Machinery industry	*	69
WRSEC Firms		
Innovation/Wages paid = $100,000-$1/2 m	*	82
Innovation/Sales = $1 m to over $5 m and over Six innovations/Sales = $1 m to over $5 m		
One innovation/plastics, metal fabricating and machinery industries	*	82
One innovation/1-4 product lines and One innovation/over 8 product lines and Over six innovations/over 8 product lines	**	82
All the Firms (excluding Moose Jaw - no cases in the Category)		
Unpatented innovations/1979 sales of $5 m and over	**	44

TABLE 67

Licenses & other forms of Legal Protection

	ALL FIRMS		MLBPR		WRSEC	
	#	%	#	%	#	%
Yes	52	26	11	24	41	27
No	58	29	7	16	51	34
Expired	3	2	1	2	2	1
Expired-product still manufactured	2	1	--	--	2	1
Tried to license	3	2	1	2	2	1
Expired-products imported	1	1	--	--	1	1
Trademarks	10	5	1	2	9	6
Registered designs	1	1	--	--	1	1
Licenses plus trademarks	2	1	1	2	1	1
Exclusive marketing rights	1	1	--	--	1	1
N/A	64	32	23	51	41	27

TABLE 68

Location of Firms that Granted the Licenses

		ALL FIRMS		MLBPR		WRSEC	
	Location	#	%	#	%	#	%
0	Manitoba	2	1	2	4	--	--
1	Saskatchewan	15	8	1	2	14	9
2	Alberta	4	2	2	4	2	1
3	B.C.	3	2	2	4	1	1
4	Eastern Canada	6	3	2	4	4	3
5	USA	31	16	1	2	30	20
6	Europe	4	2	1	2	3	2
7	Australasia	---	--	--	--	--	--
8	Canada-province not specified	9	5	2	4	7	5
9	Canadian government	---	--	--	--	--	--
M	N/A	123	62	32	71	91	60

TABLE 69

R & D undertaken in the last five years

	ABSOLUTE FREQ	% of ALL FIRMS
None	7	4.3
Between ½%-5% spent on R & D	131	79.9
R & D made available	15	9.1
Little R & D from parent	7	4.3
Some R & D, but mostly from parent	4	2.4
N/A	33	Missing
Total	197	100.0

Valid Cases 164 Missing Cases 33

TABLE 70

Resulting Products from Company's R & D Activities

Number of Products	ABSOLUTE FREQ	% of All FIRMS
None	11	7.0
1 product	26	16.5
2 products	21	13.3
3 products	17	10.8
4 products	7	4.4
5 products	2	1.3
More than 5 products	2	1.3
Several - unspecified number	4	2.5
Custom products	30	19.0
All the products	38	24.1
N/A	39	Missing
Total	197	100.0

Valid Cases 158 Missing Cases 39

TABLE 71

Resulting Products from R & D conducted by Parent (where applicable)

Number of Products	ABSOLUTE FREQ	% of ALL FIRMS
None	3	9.4
1 product	2	6.3
3 products	1	3.1
4 products	1	3.1
Several - unspecified number	1	3.1
All the products	24	75.0
N/A	165	Missing
Total	197	100.0

Valid Cases 32 Missing Cases 165

TABLE 72

Attitude on R & D

Interpretation of Codes:

0 - Generating R & D/Innovation in the near future is necessary for my company's survival.

1 - Generating R & D/Innovation is not crucial for survival, but is necessary if my company is to realize important economies of scale and thereby enhance the growth possibilities of my company in the near future.

2 - Generating R & D/Innovation is not likely to contribute to any goals of my company in the near future.

3 - Generating R & D/Innovation is likely to create more problems for my company than worthless results. My company is better off without R & D Innovation.

	ALL FIRMS		MLBPR		WRSEC	
	#	%	#	%	#	%
0	75	38	17	38	58	38
1	86	44	18	40	68	45
2	34	17	10	22	24	16
3			--	--		
N/A	2	2	--	--	2	2

TABLE 73

Contribution of R & D to Performance Aspects

ALL FIRMS

PERFORMANCE ASPECTS	SUBSTANTIALLY		MODERATELY		SLIGHTLY		NO EFFECT		A NEGATIVE EFFECT		N/A	
	#	%	#	%	#	%	#	%	#	%	#	%
Total Profit	75	38	59	30	36	18	20	10	3	2	3	2
Growth of sales	87	44	54	27	37	19	17	9	-	-	2	1
Stability of sales & income	68	34	64	32	39	20	22	11	-	-	4	2
Reputation	94	48	43	22	36	18	20	10	-	-	4	2
Other (specify)	14	7	--	--	1	1	--	--	-	-	182	92

Contribution of R & D to Performance Aspects

REGIONAL FIRMS

PERFORMANCE ASPECTS	SUBSTANTIALLY		MODERATELY		SLIGHTLY		NO EFFECT		A NEGATIVE EFFECT		N/A	
	#	%	#	%	#	%	#	%	#	%	#	%
Total profit	16	36	9	20	14	31	6	13	-	-	--	--
Growth of sales	16	36	12	27	15	33	2	4	-	-	--	--
Stability of sales & income	14	31	12	27	14	31	5	11	-	-	--	--
Reputation	17	38	10	22	13	29	5	11	-	-	--	--
Other (specify)	3	7	--	--	--	--	-	--	-	-	42	93

TABLE 73 (continued)

Contribution of R & D to Performance Aspects

METROPOLITAN FIRMS

PERFORMANCE ASPECTS	SUBSTANTIALLY		MODERATELY		SLIGHTLY		NO EFFECT		A NEGATIVE EFFECT		N/A	
	#	%	#	%	#	%	#	%	#	%	#	%
Total profit	59	39	50	33	22	14	14	9	3	2	3	2
Growth of sales	71	47	42	28	22	14	15	10	-	-	2	1
Stability of sales & income	54	36	52	34	25	16	17	11	-	-	4	3
Reputation	77	51	33	22	23	15	15	10	-	-	4	3
Other (specify)	11	7	--	--	1	1	--	--	-	-	140	92

TABLE 74

Frequency Distribution of the Multiple Responses on the Influence of Parents on the R & D Activities of their Branches.

ALL FIRMS

Parent:	COUNT	PCT OF RESPONSES	PCT OF CASES
Guarantees	24	27.6	42.1
Assigns	7	8.0	12.3
Does not influence	30	34.5	52.6
Makes Available	24	27.6	42.1
Discourages	1	1.1	1.8
Other	1	1.1	1.8
Total Responses	87	100.0	152.6
140 Missing Cases	57 Valid Cases		

TABLE 74 (continued)

Frequency Distribution of the Multiple Responses on the Influence of Parents on the R & D Activities of their Branches.

REGIONAL FIRMS

Parent:	COUNT	PCT OF RESPONSES	PCT OF CASES
Guarantees	3	23.1	33.3
Assigns	2	15.4	22.2
Does not influence	8	61.5	88.9
Total Responses	13	100.0	144.4
36 Missing Cases	9 Valid Cases		

TABLE 74 (continued)

Frequency Distribution of the Multiple Responses
on the Influence of Parents on the
R & D Activities of their Branches

ALL METROPOLITAN FIRMS

Parent:		COUNT	PCT OF RESPONSES	PCT OF CASES
Guarantees	1	21	28.4	43.8
Assigns	2	5	6.8	10.4
Does not influence	3	22	29.7	45.8
Makes available	4	24	32.4	50.0
Discourages	5	1	1.4	2.1
Other	6	1	1.4	2.1
Total Responses		74	100.0	154.2

104 Missing Cases 48 Valid Cases

TABLE 75

The Extent of Parents' Supervision on Branches

	ALL FIRMS		MLBPR		WRSEC	
Supervised:	#	%	#	%	#	%
Extensively	9	5	2	4	7	5
Partly	28	14	4	9	24	16
Negligibly	18	9	2	4	16	11
No reply	1	1	1	2	---	--
N/A	141	72	36	80	105	69

TABLE 76

Respondents' Views on the Present & Future Prospects of Innovation in Canada

	ALL FIRMS		MLBPR		WRSEC	
Views	#	%	#	%	#	%
Favourable	29	15	2	4	27	18
Industry not innovative enough	9	5	--	--	9	6
Prospects are good	10	5	2	4	8	5
Depends on government regulation	6	3	--	--	6	4
Present is unsure	5	2	1	2	4	3
Good in the future	9	5	1	2	8	5
Major changes in the future	7	4	1	2	6	4
More favourable in the US	6	3	2	4	4	3
Maintain present conditions	2	1	--	--	2	1
Industry quite innovative at present	5	2	1	2	4	3
N/A	109	55	35	78	74	49

TABLE 77
Respondents' Views on the Climate for Technological Innovation

	ALL FIRMS		MLBPR		WRSEC	
	#	%	#	%	#	%
Available opportunities	14	7	1	2	13	9
Available expertise	3	2	--	--	3	2
Favourable	11	6	1	2	10	7
Right climate	6	3	--	--	6	4
Real for energy	8	4	2	4	6	4
Open for change	4	2	--	--	4	3
Improving	10	5	1	2	9	6
Unfavourable	3	2	2	4	1	1
Speed of accepting innovation is good	1	1	--	--	1	1
N/A	137	70	38	84	99	65

TABLE 78
Respondents' Views on the Impediments to more effective use of Technology in Industry

	ALL FIRMS		MLBPR		WRSEC	
	#	%	#	%	#	%
Lack of finance	6	3	1	2	5	3
Conservation	12	6	1	2	11	7
Government standards	11	6	3	7	8	5
High interest rates	1	1	--	--	1	1
Tax structure	2	1	--	--	2	1
Small market size	4	2	--	--	4	3
Lack of skilled personnel	7	4	--	--	7	5
High raw material costs	8	4	1	2	7	5
US branch plants (competition)	4	2	--	--	4	3
Nature of the market	3	2	1	2	2	1
N/A	139	71	38	84	101	66

TABLE 79
Respondents' Suggestions to Government on ways to promote more Innovation

Suggestions	ALL FIRMS #	ALL FIRMS %	MLBPR #	MLBPR %	WRSEC #	WRSEC %
No government interference	18	9	--	--	18	12
Tax credits	9	5	1	2	8	5
Non-discretionary R & D funding	11	6	1	2	10	7
Re-evaluation of government standard codes	4	2	--	--	4	3
Specific incentives for each region	5	2	--	--	5	3
De-regulation	5	2	1	2	4	3
Help in marketing innovations	12	6	3	7	9	6
Help in exporting innovations	2	1	--	--	2	1
Less emphasis on dying industries	7	4	--	--	7	5
More scientific training	10	5	--	--	10	7
N/A	114	58	39	87	75	49

TABLE 80
Respondents' Views on Organized Research Pools

	ALL FIRMS #	ALL FIRMS %	MLBPR #	MLBPR %	WRSEC #	WRSEC %
Good rapport with the appropriate agency	11	6	3	7	8	5
Agencies not specific enough	2	1	--	--	---	--
Agencies are not important	2	1	--	--	2	1
NRC is very effective	6	3	--	--	---	--
Agencies help big companies only	1	1	1	2	---	--
N/A	175	89	41	91	134	88

TABLE 81

Summary of Relevant Federal Government Programmes

Programme	Purpose	Eligibility	Extent of Assistance	History/Key Features
Enterprise Development Program (EDP)	To promote innovation of Products/processes	Canadian Companies	Cost sharing, loans, grants (up to 75% of eligible costs)	Established 1977 Replaces PAIT, GAAP, AAA, IDAP, PIDA, PEP, FTIAP
Industrial Research Assistance Program (IRAP)	To promote R & D facilities	Technological industry groups or institutes	Grants during facility start-up and early operations	Established 1962 Assistance is limited to seven years
Program for Export Market Development (PEMD)	To promote Canadian exports (products)	Canadian Manufacturers (already competitive in foreign markets)	50-50 sharing of costs incurred on export orders	No repayment if export is unsuccessful
Promotional Projects Program	To promote the export of Canadian products and services	Canadian firms	Cost sharing on trade fairs	
Regional Development Incentives Act (RDIA)	To establish, expand or modernize manufacturing or processing in show growth areas	Anyone willing to operate in the designated areas	Grant for a percentage of approved capital costs and jobs directly created. Loan guarantees	Established 1969 Prior approval of all expenditures is absolutely mandatory

Source: Adapted from Doherty (1982) Industrial Assistance Programmes in Canada, 1981-82 CCH Don Mills, Ontario, Canada.

TABLE 82

Summary of Relevant Provincial Governments' Programmes

Programme	Purpose	Eligibility	Extent of Assistance	History/Key Features
Alberta: Alberta Opportunity Company	To promote the diversification of the Alberta economy	Manufacturers and processors	Loans and loan guarantees	No forgivable loans allowed
Manitoba: Industry, Trade and Commerce	To attract new firms and assist with expansion of existing firms	All firms wishing to establish in the province	Subsidy on a cost shared basis	Extensive support for product research and design
Saskatchewan: 1. Economic Development Corporation	To supply financial assistance for establishment or expansion of industrial enterprises	Industrial Enterprises	Mortgage and working capital loans, industrial sites & building research grants	Operates a research park
2. Industry & Commerce	To create new firms	All enterprises except farming	Loans or grants	Provides a product development program

TABLE 83

Frequency of Use of Government Programs (All Firms)

Programs	Number of Times 1 # of Firms	 1 %	 2 # of Firms	 2 %	 3 # of Firms	 3 %	 Several times (# unspecified) # of Firms	 Several times (# unspecified) %
1. Defence Industry Productivity (DIP)	3	60	1	20	-	--	1	20
2. Industrial Research Assistance Program (IRDIA)	21	88	2	8	1	1		
3. Industrial Design Assistance Program (IDAP)	8	89	--	--	1	11		
4. Program for Advancement of Industrial Technology (PAIT)	16	76	3	14	2	10		
5. Program to Enhance Productivity (PEP)	2	100	--	--	-	--		
6. DREE (RDIA)	36	74	12	25	1	2		
7. FBD Bank (small loans)	5	100	--	--	-	--		
8. Provincial (small loans)	6	86	1	14				
9. Federal Export Program	14	64	2	9			6	27
10. Other Federal Programs	1	100	--	--	-	--		
11. Provincial Export Programs	5	56	2	22	2	22		
12. Other Provincial Programs	14	74	2	11	2	11		

TABLE 84a

Multiple Responses of Government Influence on Company

ALL FIRMS

	CODE	COUNT	PCT OF RESPONSES	PCT OF CASES
Enabled projects to be undertaken	0	45	20.6	51.7
Reduced desire for government assistance	1	42	19.3	48.3
Good exposure to export market	2	61	28.0	70.1
Expansion - machinery	3	38	17.4	43.7
New plant	4	3	1.4	3.4
Expansion - new product	5	7	3.2	8.0
Tried before - distrust government	6	16	7.3	18.4
Projects would have been undertaken even without government	7	2	0.9	2.3
Locational effect was disastrous	8	3	1.4	3.4
Improved labour	9	1	0.5	1.1
Total Responses		218	100.0	250.6

110 Missing Cases   87 Valid Cases

TABLE 84b (continued)

Multiple Responses of Government Influence on Company

WRSEC

CODE*	COUNT	PCT OF RESPONSES	PCT OF CASES
0	37	20.9	53.6
1	36	20.3	52.2
2	46	26.0	66.7
3	31	17.5	44.9
4	2	1.1	2.9
5	7	4.0	10.1
6	16	9.0	23.2
7	2	1.1	2.9
Total Responses	177	100.0	256.5

83 Missing Cases 69 Valid Cases

MLBPR

CODE*	COUNT	PCT OF RESPONSES	PCT OF CASES
0	8	19.5	44.4
1	6	14.6	33.3
2	15	36.6	83.3
3	7	17.1	38.9
4	1	2.4	5.6
8	3	7.3	16.7
9	1	2.4	5.6
Total Responses	41	100.0	227.8

27 Missing Cases 18 Valid Cases

* See TABLE 84 (a)

TABLE 85

Views Expressed on all the Government Programs

	ALL FIRMS		WEC		RS		MLBPR		WRSEC	
	#	%	#	%	#	%	#	%	#	%
Enabled projects to be undertaken readily	23	12	13	11	6	19	4	9	19	13
Reduced desire for further government assistance	13	7	11	9	1	3	1	2	12	8
Good exposure to the export market	4	2	3	2	--	--	1	2	3	2
Expansion - Machinery	12	6	9	7	--	--	2	4	10	7
New plant	9	5	2	2	2	6	5	11	4	3
Expansion - new product	6	3	2	2	3	10	1	2	5	3
Tried before - distrust of government	27	14	15	12	--	--	9	20	18	12
Projects would have been undertaken with help	4	2	2	2	2	6	--	--	4	3
Locational effect was disastrous	1	1	1	1	--	--	--	--	1	1
Improved labour	1	1	1	1	--	--	--	--	1	1
N/A	97	49	62	51	13	42	22	49	75	49

TABLE 86

Results of the Kruskal-Wallis One-Way Analysis of Variance by Ranks (ALL THE FIRMS)

(a) Relocation

Relocation - Efficient Building by Date of Establishment (Age)

Age	Before 1900	1900-20	1921-40	1941-50	1951-60	1961-70	1971-75	After 1975
Number of Firms	3	4	12	18	16	43	16	5
Mean Ranks	12.67	57.38	56.42	58.89	67.59	59.97	62.75	46.90

			CORRECTED FOR TIES	
CASES	CHI-SQUARE	SIGNIFICANCE	CHI-SQUARE	SIGNIFICANCE
117	7.571	0.372	15.293	0.032

Relocation - Sale of Old Building By 1969 Employment

Employment Class	<15	15-49	50-99	100-199	200-499	500-1499
Number of Firms	65	32	8	4	5	3
Mean Ranks	51.35	71.61	52.25	83.88	73.70	50.50

			CORRECTED FOR TIES	
CASES	CHI-SQUARE	SIGNIFICANCE	CHI-SQUARE	SIGNIFICANCE
117	11.321	0.045	13.055	0.023

TABLE 86 (continued)

Results of the Kruskal-Wallis One-Way Analysis of Variance by Ranks (ALL THE FIRMS)

(a) Relocation (continued)

Relocation - Low Rents By 1979 Wages Paid

Class of Wage ($)	<25,000	25,000- 49,999	50,000- 99,999	100,000- 499,999	500,000- 999,999	1 m- 4.9 m	> 5 m
Number of Firms	0	2	11	54	26	19	5
Mean Ranks	0.0	46.00	78.86	60.61	58.31	48.66	46.00

			CORRECTED FOR TIES	
CASES	CHI-SQUARE	SIGNIFICANCE	CHI-SQUARE	SIGNIFICANCE
117	6.700	0.244	12.683	0.027

Relocation - Efficient Building By 1979 Wages Paid

Class of Wage ($)	<25,000	25,000- 49,999	50,000- 99,999	100,000- 499,999	500,000- 999,999	1 m- 4.9 m	> 5 m
Number of Firms	0	2	11	54	26	19	5
Mean Ranks	0.0	10.75	48.05	64.44	64.71	46.84	60.10

			CORRECTED FOR TIES	
CASES	CHI-SQUARE	SIGNIFICANCE	CHI-SQUARE	SIGNIFICANCE
117	9.769	0.082	19.734	0.001

TABLE 86 (continued)

Results of the Kruskal-Wallis One-Way Analysis of Variance by Ranks (ALL THE FIRMS)

(a) Relocation (continued)

Relocation - Low Rents By
1969 - Value of Shipments

Value of Shipments ($)	<25,000	25,000-49,999	50,000-99,999	100,000-499,999	500,000-999,999	1 m-4.9 m	> 5 m
Number of Firms	13	13	14	35	11	19	12
Mean Ranks	60.85	77.04	54.39	55.37	68.91	57.95	46.00

			CORRECTED FOR TIES	
CASES	CHI-SQUARE	SIGNIFICANCE	CHI-SQUARE	SIGNIFICANCE
117	7.094	0.312	13.429	0.037

Relocation - Sale of Building By
1969 Value of Shipments

Value of Shipments ($)	<25,000	25,000-49,999	50,000-99,999	100,000-499,999	500,000-999,999	1 m-4.9 m	> 5 m
Number of Firms	13	13	14	35	11	19	12
Mean Ranks	38.85	44.88	55.50	59.53	68.09	73.63	67.17

			CORRECTED FOR TIES	
CASES	CHI-SQUARE	SIGNIFICANCE	CHI-SQUARE	SIGNIFICANCE
117	12.020	0.062	13.861	0.031

TABLE 86 (continued)

Results of the Kruskal-Wallis One-Way Analysis of Variance by Ranks (ALL THE FIRMS)

(b) Branch Plants

Branch plants - Large pool of unskilled labour By 1969 Employment

Employment Class	<15	15-49	50-99	100-199	200-499	500-1499
Number of Firms	21	21	7	4	5	4
Mean Ranks	29.50	30.95	33.86	29.50	42.10	29.50

			CORRECTED FOR TIES	
CASES	CHI-SQUARE	SIGNIFICANCE	CHI-SQUARE	SIGNIFICANCE
62	2.221	0.818	12.254	0.031

Branch plants - govt. Benefits By 1969 Employment

Employment Class	<15	15-49	50-99	100-199	200-499	500-1499
Number of Firms	21	21	7	4	5	4
Mean Ranks	29.60	29.33	32.79	28.00	40.20	43.25

			CORRECTED FOR TIES	
CASES	CHI-SQUARE	SIGNIFICANCE	CHI-SQUARE	SIGNIFICANCE
62	3.582	0.611	11.875	0.037

TABLE 86 (continued)

Results of the Kruskal-Wallis One-Way Analysis of Variance by Ranks (ALL THE FIRMS)

(b) Branch Plants (continued)

Branch plant - advantage of untapped market By 1979 Employment

Employment Class	<15	15-49	50-99	100-199	200-499	500-1499
Number of Firms	4	19	13	11	8	7
Mean Ranks	21.75	35.24	40.35	21.73	34.56	22.36

			CORRECTED FOR TIES	
CASES	CHI-SQUARE	SIGNIFICANCE	CHI-SQUARE	SIGNIFICANCE
62	10.364	0.066	11.002	0.050

Branch plant - Benefits of government Assistance By 1979 Employment

Employment Class	<15	15-49	50-99	100-199	200-499	500-1499
Number of Firms	4	19	13	11	8	7
Mean Ranks	28.00	28.00	30.58	31.05	31.50	45.43

			CORRECTED FOR TIES	
CASES	CHI-SQUARE	SIGNIFICANCE	CHI-SQUARE	SIGNIFICANCE
62	5.079	0.406	16.835	0.005

TABLE 86 (continued)

Results of the Kruskal-Wallis One-Way Analysis of
Variance by Ranks (ALL THE FIRMS)

(c) Acquisition

Acquisition - retain market share By
1969 Employment

Employment Class	<15	15-49	40-99	100-199	200-499	500-1499
Number of Firms	19	14	8	4	3	1
Mean Ranks	24.24	23.96	25.38	17.50	46.17	17.50

			CORRECTED FOR TIES	
CASES	CHI-SQUARE	SIGNIFICANCE	CHI-SQUARE	SIGNIFICANCE
49	8.094	0.151	12.250	0.032

Acquisition - Benefits of government incentives By
1969 Value of Shipment

Value of Shipments ($)	<25,000	25,000-49,999	50,000-99,999	100,000-499,999	500,000-999,999	1 m-4.9 m	> 5 m
Number of Firms	4	1	1	9	12	14	8
Mean Ranks	24.50	24.50	49.00	24.50	24.50	24.50	24.50

			CORRECTED FOR TIES	
CASES	CHI-SQUARE	SIGNIFICANCE	CHI-SQUARE	SIGNIFICANCE
49	2.880	0.824	48.000	0.000

TABLE 86 (continued)

Results of the Kruskal-Wallis One-Way Analysis of Variance by Ranks (ALL THE FIRMS)

(d) Expansion in situ

Expansion in situ - Lower Costs By 1969 Value of Shipments

Value of Shipments ($)	<25,000	25,000-49,999	50,000-99,999	100,000-499,999	500,000-999,999	1 m-4.9 m	> 5 m
Number of Firms	8	9	6	31	14	25	16
Mean Ranks	63.94	63.11	70.00	51.48	52.43	62.24	38.09

			CORRECTED FOR TIES	
CASES	CHI-SQUARE	SIGNIFICANCE	CHI-SQUARE	SIGNIFICANCE
109	8.948	0.177	14.567	0.024

Expansion in situ - Available Adjacent Land By 1979 Value of Shipments

Value of Shipments ($)	<25,000	25,000-49,999	50,000-99,999	100,000-499,999	500,000-999,999	1 m-4.9 m	> 5 m
Number of Firms	0	0	1	12	12	38	45
Mean Ranks	0.0	0.0	28.00	72.00	38.33	54.01	55.14

			CORRECTED FOR TIES	
CASES	CHI-SQUARE	SIGNIFICANCE	CHI-SQUARE	SIGNIFICANCE
108	7.687	0.104	9.294	0.054

TABLE 87

Number & Type of Moves (City) by Firms

	ALL FIRMS		MLBPR		WRSEC	
	#	%	#	%	#	%
One-intracity	84	43	15	33	69	45
One-intercity	5	2	5	11	--	--
Two-intracity	11	6	2	4	9	6
Two-inter & intracity	7	4	2	4	5	3
Three-intracity	6	3	--	--	6	4
Three-2 intercity, 1 intracity	1	1	--	--	1	1
Farm to city	1	1	--	--	1	1
Four-1 intercity, 3 intracity	--	--	--	--	--	--
More than four	2	1	--	--	2	1
N/A	80	41	21	47	59	39

TABLE 88

Number & Type of Moves (Province) by Firms

	ALL FIRMS		MLBPR		WRSEC	
	#	%	#	%	#	%
Same province	112	57	23	51	89	59
Same province (2 moves)	3	2	1	2	3	2
Different provinces (2 motives)	2	1	--	--	1	1
N/A	80	41	21	47	59	39

TABLE 89

Year of Last Move
of Firms

	ALL FIRMS		MLBPR		WRSEC	
	#	%	#	%	#	%
1900 - 20	2	1	--	--	2	1
1921 - 40	1	1	--	--	1	1
1941 - 50	1	1	--	--	1	1
1951 - 60	8	4	--	--	8	5
1961 - 70	32	16	6	13	26	17
1971 - 75	21	11	3	7	18	12
After 1975	52	27	15	33	37	25
N/A	80	41	21	47	59	39

TABLE 90

The Main Correlations between the Location Decision Variables and the Controlling Variables - All the Firms

	* 99% ** 95%	Rs	# of Firms
Relocation			
Lower rents and rates/Age (Date of establishment)	*	0.2349	117
Proximity of new market/Age	**	-0.1688	117
Release of capital from sale of building/ Age	**	-0.1771	117
Managerial enthusiasm/Age	*	0.2166	117
Improved environment/Age	*	0.1980	117
Lower rents/Employment (1979)	*	-0.2182	117
Release of capital from sale of building/ Employment (1979)	**	0.1892	117
Managerial enthusiasm/Employment (1979)	**	-0.1572	117
Improved environment/Employment (1979)	**	-0.1859	117
Efficient building/Employment (1969)	**	-0.1708	117
Proximity of new market/Employment (1969)	*	0.2024	117
Improved environment/Employment (1969)	**	-0.1752	117
Less labour turnover/Value of Shipments (1979)	**	-0.1576	117
Consolidate activities/Value of Shipments (1979)	**	0.1701	117
Lower rents and rates/Value of Shipments (1969)	**	-0.1611	117
Release of capital from sale of building/ Value of Shipments	*	0.3307	117

TABLE 90 (continued)

The Main Correlations between the Location Decision Variables and the Controlling Variables - All the Firms

	* 99% ** 95%	Rs	# of Firms
Branch Plant			
Government incentives/Age	**	-0.2191	62
Labour/Employment (1979)	*	0.3265	62
Proximity to resources/Employment (1979)	**	0.2284	62
Supplement output/Employment (1979)	**	0.2626	62
Labour/Employment (1969)	**	0.2399	62
Government incentives/Employment (1969)	*	0.3468	62
Supplement output/Value of Shipments (1969)	**	0.2292	62
Merger			
Retain market share/Value of Shipments (1979)	**	-0.2452	49
Expansion in situ			
Lower costs/Age	**	0.1607	109
Maintain contacts/Age	**	0.1637	109
Lower costs/Employment (1979)	**	-0.1661	109
Maintain contacts/Employment (1979)	**	-0.1531	109
Lower costs/Value of Shipments (1979)	**	-0.1712	109

TABLE 91

Constraints on Growth of Firms
Significant Variables

	Significance * 1% ** 5%	N Cases
All the Firms Surveyed		
Specific labour requirements/Industry type	**	144
Type of labour lacking/Industry type	*	136
Labour Competition/Age Present and future problem for companies established between 1941 and 1970	*	66
High labour Costs/Age Past, present, future problem for firms established between 1961-1970; Future problem for 1941-1960 firms	*	68
Insufficient government assistance/Age Past, present problem for firms established between 1961-1970	**	15
Uncertainty on government policy/Industry type Present, future problem for oil and gas firms	**	43
High costs of land and capital/Industry type Present, future problem for plastics	*	43
Financial resources/Age Past for 1940-1951 firms; past, present problem for 1961-1970 firms	**	30
Possible solution to problem/Industry type Agricultural implement farms will sell; others will diversify	*	195
Winnipeg, Edmonton, Calgary (WEC)		
High labour costs/Age Future problems for 1961-1970 firms	*	38
Lack of a control system/Industry type Past problem for oil and gas firms	**	19
Lack of budgetary control/Age Past for 1921-1940 firms; 1951-1960 firms	*	24
High transport costs/Age Future problem for 1941-1950 firms	**	42
Financial resources/Industry type Past for agricultural implement farms	*	19
Small domestic market/Age Past, present, future problem for 1921-1950 firms	*	21

TABLE 91 (continued)

Constraints on Growth of Firms
Significant Variables

	Significance * 1% ** 5%	N Cases
Regina, Saskatoon (RS)		
Labour competition/Age Past, present, future problem for 1941-1960 firms	**	10
Product problems/Industry type Past problem for agricultural implement farms	**	8
Moose Jaw, Lethbridge, Brandon, Prince Albert and Red Deer (MLBPR)		
Little borrowing power/Age Past for 1951-1970 firms; past, present, future for 1951-1960 firms	**	18
Labour required/Industry type welders-agricultural implement firms	**	20
Labour required/Age welders - 1921-1940 firms	*	20
High cost of land/Age	*	10
Low market growth/Age	*	13
Technological obsolescence/Age	**	7
All the Firms		
Control system/past problem for firms which employed between 5 to 15 people in 1969-1970	**	26
Seasonal fluctuations/always a problem for firms employing less than 15 people	**	14
High taxes/past and present problem for <15 people (1979-1980)	*	28
Uncertainty government policy/always a problem for the 15-49 size firm	*	48
WRSEC Firms		
High taxes Past, present problem for 15-49 employment size	*	24

TABLE 92

Action to be undertaken on Constraints to Growth

ALL FIRMS

	ALL		WRSEC		MLBPR	
	#	%	#	%	#	%
Sell the company	63	32.0	43	32	14	31
Close the company	13	6.6	10	7	3	7
Relocate	19	9.6	15	10	4	9
Expand into other fields	27	13.7	22	14	5	11
Transfer to family	15	7.6	7	5	8	18
Carry on as best as possible	28	14.2	22	14	6	13
Relocate - outside Alberta	1	0.5	1	1	--	---
Relocate to the USA	16	8.1	16	11	--	---
Appeal to government	9	4.6	6	4	3	7
Action already undertaken -manufacturing is being phased out	4	2.0	4	3	--	---
N/A	2	1.0	---	---	2	4
Total	197	100.0	146	100	45	100

TABLE 93

Outline of Incentives Provided by Canada & the USA

Canada (DREE)	USA
Forms of Aid	
1. Loans-guaranteed.	1. Loans-at subsidized rate of guaranteed.
2. Investment grants for machinery & equipment & industrial buildings.	2. Assistance toward operating costs.
3. Fiscal concessions on investment.	3. Other
4. Grants toward labour costs.	
Limits to Aid	
- Yes (specified limits)	- Yes
Conditions on Payment	
- Yes (many)	- Yes (few)
Methods of Monitoring Assisted Firms for Proper Use of Aid	
- Inspection after commencement of commercial production & during ensuing control period.	- Site investigation, progress reports & post-award audits.
Methods of Monitoring Assisted Firms for Continued Viability	
- Inspection at time of final payment.	- Periodic contacts, monitoring, and post-award auditing.

Sources: OECD (1979)

BIBLIOGRAPHY

Aharoni (1966) *Foreign Investment Decision Process*, Harvard University.

Ajao, A. & R.G. Ironside (1981) *The Life Cycle of Manufacturing Firms in the Prairie Provinces.* Paper presented to the Industrial Activity and Area Development symposium Edinburgh.

Amadeo, E.P. (1973) 'Some ideas for a new approach to the theory of the product cycle.' *Economica* 19:135-145.

Anderson, J.(1968) "Economic base measurement and changes in the base of metropolitan Edmonton, 1951-1961", *The Albertan Geographer*, no. 4 4-9.

Andreasen, A.R. (1970) "Personalizing mail questionnaire correspondence" *Public Opinion Quaterly* 34:273-277.

Appana, M. (1975) *Industrial Location Determinants in Prairie Manufacturing Industries.* Unpublished M.A. thesis. University of Manitoba, Department of Geography, Winnipeg.

Bain, J.S. (1956) *Barriers to New Competition*, Cambrigde, Harvard.

Barr, B.M. (1972) "Reorganization of the Prairie economy since 1945", in P.J. Smith (ed) *The Prairie Provinces*, 65-82.

and K. Fairbairn (1975) "Inter-industry manufacturing linkages within Alberta," *New Themes in Western Canada Geography*, Langara papers, 37-65.

and K. Fairbairn (1977) "Calgary and Edmonton manufaturers' perception of economic opportunity in Alberta", *Research Studies by Western Canadian Geographers:* The Edmonton papers, 9-24.

Baumol, W.J. (1959) *Business Behaviour, Value and Growth* Macmillan, New York.

Baumol, W.J. (1962) "On the theory of expansion of the firm", *American Economic Review*, 52, 1078-1987.

Beasley, M. (1955) "The birth and death of industrial establishment", *Journal of Industrial Economics*, 45-61.

Bellan, R. C. (1968)*Principles of Economics and the Canadian Economy*. Mcgraw-Hill. Toronto.

Berry, B., Conkling and D. Ray (1976) *The Geography of Economic Systems.*

Beyers, W. B. (1979) "Contemporary trends in the regional economic development of the U.S." *The Professional Geographer*. 31, 34-44.

Bourne, L.S. & J.W. Simmons (1979) *Canadian Settlement Trends:* An examination of the spatial pattern growth, 1971-76, Major report #15, Centre for Urban and Community Studies. University of Toronto.

Bower, (1970)

Britton, J.H. (1974) "Environmental adaptation of industrial plants", in I. F. Hamilton (ed) *Spatial Perspectives on Industrial Organization and Decision-making*. Wiley. 363-392.

"The influence of corporate organization and ownership on the linkages of industrial plants," *Economic Geography*. 312-324.

Burns, A.F. (1934) *Production Trends in the United States since 1870* National Bureau of Economic Research, New York.

Buswell, R.J. and E.W. Lewis (1970) "The geographical distribution of industrial research activity in the U.K", *Regional Studies*, 4. 277-306.

Caves, R. and R. Holton (1961) *The Canadian Economy:Prospect and Retrospect.* Harvard University Press. 195-232.

Cannon, J. (1980) "The impact of investment incentives on manufacturing change: the Georgian Bay region of Ontario. *The Canadian Geographer*. 24. 131-148.

Chamberlain, E. H. (1933) *The Theory of Monopolistic Competition* Harvard University Press, Cambridge, Mass.
Centre for Urban and Regional Development Studies (1979) *The Mobilization of Indigenous Potential in the U.K.* A report to the EEC. The University of Newcastle upon Tyne, England.

Chandler, A.D. (1962) *Strategy and Structures*. MIT Press

Collins, L. (1972) *Industrial Migration in Ontario.* Statistics Canada, Ottawa.

Cohen, Y.S and B.L.J. Berry (1975) *Spatial Components of Manufacturing Change*. Department of geography University of Chicago. Research paper # 172.

Comeau, R.L. (1969) *A study of the Area Development Agency Program in Nova Scotia* A report submitted to the ADA, DREE, Ottawa.

Cromley, R.G. and T.R. Leinbach (1981) "The pattern and impact of the filter down process in non-metropolitan Kentucky", *Economic Geography*, 57. 208-224.

Crum, R.E. and Gudgin (1977) *Non-production Activities in the U.K. Manufacturing Industry*. Commission of the European Communities Collection Studies Regional Policy Series No. 3.

Currie, A.W. (1967) *Canadian Transportation Economics* University of Toronto Press.

Cyert, R. M. & J.G. March (1963) *A Behavioural Theory of the Firm* Prentice-Hall, Englewood Cliffs, New Jersey.

Czamanski, S., D. Czamanski and S. Ellis. (1972) *Study of Clustering of Industries*. Institute of Public Affairs. Dalhousie University.

Davis J.T. (1980) "Some implications of recent trends in the provincial distribution of income and industrial product in Canada". *The Canadian Geographer*. 24. 221-236.

De Kluyver, C.A. (1977) 'Innovation and industrial product life cycles', *California Management Review*. 20:21-23.

Dhalla, N. K. & Sonia Yuspeh (1976) 'Forget the product life cycle concept' *Harvard Business Review* 102-112.

Dicken, P. (1971) "Some aspects of the decision-making behaviour of business organizations", *Economic Geography*, 47. 426-437.

Dillman, D.A. (1972) "Increasing mail questionnaire response in large samples of the general public" *Public Opinion Quaterly* 36: 254-257.

Department of Regional Expansion (1973) *Assessment of the Regional Development Incentives Program*, Ottawa, 3.

Doherty & Whinney (1981) *Industrial Assistance Programmes in Canada 1981-82*. Don Mills, Ont.

Drugge, S. (1969) "Measurements, causes and trends in regional economic equality in Alberts", *Alberta Human Resources Research Council*, Edmonton.

Economic Council of Canada (1977) *Living Together*. Supply and Services Canada.

(1979) *The Interregional Diffusion of Innovations in Canada* by F. Martin et al., Supply and Services Canada, Hull, Quebec.

Erickson, R.A. (1976) "The filtering-down process: Industrial location in a non-metropolitan area", *The Professional Geographer*. 28. 254-260.

Fairbairn K. and B. Barr (1978) "Edmonton's manufacturing economy: a comparative analysis" in *Edmonton: The Emerging Metropolitan Economy* edited by P.J. Smith. Western Geographical Series, Department of Geography, University of Victoria 15. 29-57.

Field, N.C. and D. Kerr (1968) *Geographical Aspects of Industrial Growth in Metropolitan Toronton Region*. Ontario Department of Treasury. Research paper no.1 Toronto.

Fox, D & K. Guire (1976) *Documentation for MIDAS*, 3rd edition.

Florence, S. (1953) *The Logic of British and American Industry*. University of North Carolina Press.

Friedmann, J (1953) *Urbanization, Planning and National Development*. Sage. Beverly Hill, Calif.

Gaston, J.D. (1961) *Growth Patterns in Industry: A Reexamination*. Studies in Business Economics. No. 75. National Industrial Conference Board, New York.

Gibson, J.C. (1965) "The economic effects of rail-line abandonment in the prairie provinces", *Sixth National Farm and Business Forum*. Winnipeg, Manitoba.

Gilmour, J.M. (1972) *Spatial Evolution of Manufacturing: Southern Ontario, 1851-1891*. University of Toronto, Department of Geography. Research Publication No. 10.

Globerman, S. (1974) *Technological Diffusion in Canadian Manufacturing Industries*. Department of Industry, Trade and Commerce. Ottawa.

Goddard, J.B. (1971) "Office communications and office location: a review of current research", *Regional Studies*. 5:263.

and I.J. Smith (1978) "Changes in corporate control in the British urban system, 1972-1977", *Environment & Planning (A)* 10:1273-1084

Gold, B. (1964) 'Industry growth patterns: theory and empirical results', *Journal of Industrial Economics*. 13:53-73.

Gort, M. (1969) "An economic disturbance theory of mergers", *Quarterly Journal of Economics*, 83:624-642.

Grabowski, H.G. and D.C. Mueller (1975) "Life cycle effects on corporate returns on retentions", *Review of Economics and Statistics*.

Green, D.H. (1974) *Information, Perception and Decision-making in the Industrial Relocation Decision*. University of Reading.

Hall Commission (1977) *Grain and Rail in Western Canada*. Supply and Services Canada. Ottawa.

Hakanson, L. (1979)"Towards a theory of location and corporate growth", in F.E.I. Hamilton and Linge (editors) *Spatial Analysis, Industry and the Industrial Environment*. Wiley and Sons, London.

Hamilton, I.F. (1967) "Models of industrial location", in Haggett, P. and r. Chorley, *Socio-economic Models in Geography*, Methuen. London.

(1974) *Spatial Perspective on Industrial Organization and Decision*, Wiley and sons, London. Chapter one.

Hanson, E.J. (1966) "Regional employment and income effects of the petroleum industry in Alberta", paper presented to *AIME*, annual conference, New York.

Hewitt, G.K. (1981) *R & D in Selected Canadian Industries*. Department of Industry, Trade and Commerce. Ottawa.

Hiller, J. (1976) *The Neo-classical and Managerial Theories of the Firm: An Empirical Test*. Unpublished Ph. D.

Hirsch, Seev (1972) "The United States electronics industry in international trade", in *The Product Life Cycle and International Trade*. edited by L.T. Wells. Harvard Business School, Boston. 39-52.

Hirchman, A.O. (1958) *The Strategy of Economic Development*, Yale University Press, New Haven, Conn.

Hoover, E.M. (1948) *The Location of Economic Activity*. McGraw-Hill Inc., New York.

Hymer, S. & P. Pashigian (1962) "Firm size and rate of growth", *Journal of Political Economy* LXX:557

Jewkes, J. et al., (1969) *The Sources of Invention*, 2nd edition. Macmillan. London.

Keeble, D (1968) "Industrial decentralization and metropolis", *transactions Of the Institute of British Geographers*, 44:1-44.

(1976) *Industrial Location and Planning in the United Kingdom*, Methuen, London.

Kerr, D. (1968) "Metropolitan dominance in Canada", in J. Warkentin (ed) *Canada: A Geographical Interpretation*. Methuen. 531-555.

and Spelt, J. (1960) "Manufacturing in suburban Toronto, in *The Canadian Geographer*, No.12. 11-19.

Krumme, G. (1969) "Towards a geography of enterprise", *Economic Geography*. 45:30-44.

Kubinski, Z. M. (1979) *The Small Firm in the Albertan Oil and Gas Industry*. Department of Industry, Trade and Commerce, Ottawa.

Kuz, P. (1974) *Winnipeg*. Manitoba Department of Industry and Commerce, Manitoba.

Kuznets, S (1929) "Retardation of industrial growth", *Journal of Economic and Business History*, 1:534-560.

Leigh, R. and D. Carter. (1972) "Spatial patterns of economic growth in Alberta, 1961-1966", *The Albertan Geographer*, No. 8. 49-55.

Leinbach, T.R. (1978) "Locational trands in non-metropolitan industrial growth", *The Professional Geographer*, no.1 30:30-36.

Lever, W.R. (1981) *Urban Scale as a Determinant of Employment Growth or Decline*. IBG, Anglo-Canadian Symposium, Edinburgh.

Levitt, T: (1965) "Exploit the product cycle", *Harvard Business Review*, 43:81-94.

Lewis, E.W. (1971) *The Location of Manufacturing Industry in the Western Home Countries*, Unpublished M.Phil. thesis. University of London.

Li, S., D. Scorrar, and M. Williams (1978) "City functions, manufacturing activity and the urban hierarchy", in Irving, R. (ed) *Readings in Canadian Geography*. 3rd edition. Harper and Row London.

Little, B. (1974) *The Role of Government in Assisting New*

Product Development. Department of Industry, Trade and Commerce. Ottawa.

Litvak, I.A. et. al., (1971) *Canadian Entrepreneurship - A Study of Newly Established Firms*. Department of Industry, Trade and Commerce.

Lloyd, P. and P. Dicken (1977) *Location in Space*, 2nd edition Harper and Row, London.

Lonsdale, R. and C. Browning (1971) "Rural-urban locational preferences of southern manufacturers", *Annals, AAG. 61:255-268.*

and H.L. Seyler (1979) Nonmetropolitan Industrialization. Halsted Press, New York.

Low, R (1970) *Modern Economic Organization*, Irwin. Homewood.

Luttrell, W. (1962) *Factory Location and Industrial Movement*. National Institute of Economic and Social Research, London.

Machlup, F. ( ) "Theories of the firm: marginalist, behavioural, managerial" *American Economic Review* LV11:1-33.

Malecki, E.J. (1979) "Agglomeration and intra-firm linkage in R & D location in the U.S." *Tijdschrift voor Economische en Sociale Geografie*, 70:322-332.

(1979) "Locational trends in the R & D by large U.S. corporations, 1965-1977", *Economic Geography*. 55:309-323.

(1981) "Government-funded R & D: some regional implications" *The Professional Geographer*. 33:72-82.

Manitoba Economic Development Advisory Board (1971) *The Challenge* conference on economic development in Manitoba, Winnipeg.

(1975) *Incentives, Location and Regional Development*. Edited by P. Phillips, Winnipeg.

(1976) *Manufacturing Rationalization Trends in. Manitoba* Winnipeg.

Markham, J. (1955) "Survey of evidence and findings of mergers" in *Business Concentration and Price Policy* National Bureau of Economic Research, special conference series 5, Princeton University Press.

Marshall, J.U. (1975) "City size, economic diversit, and functional type: the Canadian case", *Economic Geography*. 51:37-49.

Massey D, and R.A. Meegan (1978) The geography of industrial reorganization: the spatial effects of the restructuring of the electrical engineering sector under the IRC. *Progress in Planning*.

Maxwell, J. (1965) "Functional structure of Canadian cities", *Geographical Bulletin*, 7:99-104

J. Grieg, and H. Meyer. (1972) "The functional structure of Canadian cities: a classification of cities in R.M. Irving *Readings in Canadian Geography*. Holt. Toronto.

Mellor,I. and R.G. Ironside (1978) "The incidence multiplier impact of aregional development programme", *The Canadian Geographer*, 22:225-251.

MOSST (1979) *R & D Expenditures in Canada* Supply and Servies Canada, Ottawa.

Mueller, D.C. (1969) "A theory of conglomerate merger", *Quarterly Journal of Economics* 56:643-659.

Mueller, D. C. (1966) "Patents, research and development, and the measurement of inventive activity", *Journal of Industrial Economics* 15:

Mueller, E. and J. Morgan (1962) "Location decisions of manufacturers", *American Economic Review*, Papers and Proceedings, 502:204-217.

Mueller,D.C. (1972) "A life cycle theory of the firm", *Journal of Industrial Economics* 20:199-219.

Muth, R.F. (1968) "Differential growth among large U.S. cities", in *Papers in Quantitative Economics*, edited by J.P. Quirk and A.M. Zarley. University of Kansas Press. Lawrence. 315-355.

Myrdal, G. (1957) *Rich Lands and Poor* Harper and Row, New York.

Nash, P.A. (1979) *Technological Choice in a Peripheral Economy:the Case of Ireland*. Centre for Urban and Regional Development Studies, University of Newcastle upon Tyne, England.

Nagarajan, P. (1980) "Canadian employment growth and structural adaptation, 1961-71", *The Canadian Journal of Regional Science*, 3:193-208.

Nelson, R. (1959) *Merger Movements in American Industry*, *1895-1956*. National Bureau of Economic Research, General Series 66, Princeton University press.

Newbould, G. (1970) *Management and Merger Activity* Guthstead, Liverpool.

Norcliffe, G. (1975) "A theory of manufacturing places", in L. Collins and D. Walker. *Locational Dynamics in Manufacturing Activity*. Wiley, London. 19-57.

Norrie, K. & M.B. Percy (1979) *Westward Shift and Interregional Assessment*. Economic Council of Canada, Discussion paper #201.

North, D. (1974) "The process of locational change in different manufacturing organisations", in I.F. Hamilton, (ed) *Spatial Perspectives on Industrial Organizations and Decision-making*. Wiley, London.

Norton, R.D. and J. Rees (1979) "The product cycle and the spatial decentralization of American manufacturing", *Regional Studies, 13:141-151*.

Oakey, R.P. (1979) An Analysis of the Spatial Distribution of Significant British Industrial Innovations. Centre for Urban and Regional Development Studies, University of Newcastle upon Tyne, England. Discussion paper #25.

(1982) *Finance and Innovation in British Small Independent Firms* Paper presented at the AAG, San Antonio.

Parkinson, C.N. (1957) *Parkinson's Law* Houghton Mifflin, 2-13.

Penrose, E.T. (1959) *The Theory of the Growth of the Firm*. Wiley.

Pred, A. (1966) *The Spatial Dynamics of U.S. Urban Industrial Growth, 1800-1914*. MIT Press, Cambridge.

(1967) *Behaviour and Location*. Lund Series in Geography. Series B.

(1973) The growth and development of systems of cities in advanced economies, in A. Pred and G. Tornquist, *Systems of Cities and Information Flows*, Lund Studies in Geography, Series B38, 9-82.

(1974) *Major Job-providing Organizations and Systems of Cities*, AAG. Commission on College Geography. Resource paper 27.

(1977) *City-System in Advanced Economies*. Hutchinson University Library. London.

Ray, D.M. (1967) *Market Potential and Economic Shadow*, Research paper no. 101, Department of Geography, University of Chicago.

Rees, J. (1974) "Decision-making, the growth of the firm and the business environment", in I.F. Hamilton, (ed) *Spatial Perspectives on Industrial Organization and Decision-Making*, Wiley.

(1979) "Technological change and regional shifts in American manufacturing" *The Professional Geographer*, 31:45-54.

Richtik, J. (1976) "Inventions and urban industrial growth in Canada: 1881-1901", *Geographical Perspectives*. 38:20-27.

Roterus, V. (1970) "Do small towns have a future?" *Urban Land*, March:12-15.

Royal Commission On Corporate Commission (1978) Supply and Services Canada.

Science Council of Canada (1971) *Innovation in a Cold Climate: the Dilemma of Canadian Manufacturing*. study no. 15.

(1976) *The Role and Function of Government Laboratories and the Transfer of Technology to the Manufacturing Sector* by A.J. Cordell and J. Gilmour. Background Study #35. Information Canada, Ottawa.

Schookler, J. (1965) "The size of firm and the growth of knowledge", in Griliches and L. Hurwicz (eds) *Patents, Invention and Economic Change*, Harvard University Press.

Schuman, H. and S. Presser (1977) "Question wording as independent variable in survey analysis", *Sociological Methods and Research*. 6:151-170.

(1979) "The open and closed question", *American Sociological Review*. 44:692-712.

Schumpeter, J.A. (1939) *Business cycles* McGraw-Hill, New York.

(1954) *Capitalism, Socialism and Democracy*, Allen and Unwin, London.

Seifried, N.R. (1969) "An analysis of recent changes in manufacturing in Alberta", *The Albertan Geographer*, *8:55-60*.

(1973) *"Industrial growth in southern Manitoba", in B. Barr (ed) The Kootenay Collection of Research in Geography*, no. 18, Tantalus, Vancouver.

(1978) "The expanding urban economy of a spontaneous growth centre:Edmonton, Alberta", *The Albertan Geographer*, University of Alberta.

(1981) *New Manufacturing Firms and Regional Development.* IBG. Anglo-Canadian Symposium. Edinburgh.

Semple, K. and W.R. Smith (1981) "Metropolitan dominance and foreign ownership in the Canadian urban system", *The Canadian Geographer*, 25:4-26.

Shaffer, E.H. (1976) "The employment impact of oil and natural gas in Alberta, 1961-1970", Mimeographed.

Siegel, S. (1956) *Nonparametric Statistics for the Behavioural Sciences.* McGraw-Hill.

Simmons, J.W. (1978) *Migration in the Canadian Urban System:part II, Simple Relationships*, Research paper #98. Centre for Urban and Community Studies, University of Toronto.

(1980) "Changing migration patterns in Canada:1966-1971 to 1971-1976", *The Canadian Journal of Regional Science*, 3:139-162.

Simon, H.A. (1959) "Theories of decision-making in economics and behavioural science", *American Economic Review, 262-263.*

(1960) *The New Science of Management Decisions*, Macmillan, New York.

(1962) "New developments in the theory of the firm" *American Economic Review.* L11:1-5

Singh, A. & G. Whittington (1968) *Growth, Profitability and Valuation* Cambridge University Press.

Smith, D.M. (1971) *Industrial Location.* Wiley, New york

Smith, P.J. (1962) "Calgary: a stufy of urban patterns", *Economic Geography*, 39:

Springate, D. (1972) *Regional Development Incentives Grants and Private Investment in Canada*, Ann Arbour, Michigan University Microfilms.

Stafford, H. (1972) "The geography of manufacturers", *Progress in Geography*, 4:181-215.

Starbuck, W. (1971) *Organizational Growth and Development.* Penquin Books, Middlesex, England.

Statistics Canada (1960-78)
Fabricated Structural Metal 41-207
Ornamental and Structural Metal 41-221
Metal Stamping 41-227
Miscellaneous Metal Fabricating 41-228
Agricultural Implements 42-202
Machine shops 42-207
Miscellaneous machinery 42-214
Plastics Fabricating 47-208
(1972) Domestic and Foreign Control of Manufacturing Establishment in Canada 31-401 Biennial. Table 1 2-5, Table 4 60-69.
(1974) *Manufacturing Industries in Canada: sub-provincial area 31-209*, Annual Table 1, 32-43 and Table 3, 81-85.
(1975) *Manufacturing Industries in Canada: national and provincial area 31-303*, Annual. Table 33, 110. Table 34, 111. Table 35, 112-119. Table 36, 120-122. Table 37, 124-125, 138-139 and Table 45, 152-153.
(1975) *Manufacturing Industries of Canada: type of organization and size of establishment 31-210* Annual. Table 1, 3 and Table 3, 4-7.

Steed, G. (1971) "Forms of corporate environmental adaptation: *Tijdschrift voor Economische en Sociale Geografie*, 62:90-94.

Sternlieb, G. and J Hughes (1975) *Post-Industrial America.* Centre for Urban Policy Research, New Brunswick, New Jersey.

Summers, G.F. et al., (1976) *Industrial Invasion of Nonmetropolitan America.* Praeger.

Taylor, G.T. and Z. Silberston (1973) *The Economic Impact of the Patent System.* Cambrigde University Press.

Taylor, M.J. (1969) *Industrial Location, Seed-bed Growth and the Location of Firm.* Occassional paper, Department of Geography, University of London.

(1977) "Spatial dimensions of inventiveness in New Zealand: the role of individuals and institutions", *Tijdschrift voor economische en Sociale Geografie*, 68:330-340.

Thompson, W. (1965) *A Preface to Urban Economics.* John Hopkins.

(1968) "Internal and external factors in the development of urban economics, in H. Perloff and L. Wingo. *Issues in Urban Economics*. Hopkins Press. 43-72.

(1972) "The national system of cities as an object of public policy", *Urban Studies*, 9:99-116.

(1975) "Economic porcesses and employment problems in declining metropolitan areas", in G. Sternlieb and J. Hughes (eds.) *Post-Industrial America*. 187-196.

Thorngren, B. (1970) "How do contact systems affect regional development and planning", 2:409-427

Thomas, M.D. and R.B. Letteron (1974) "Structural change and regional industrial development", in *Proceedings of the Commission on Regional Aspects of Development of the International Geographical Union*. Edited by F.H. Helleiner and W. Stohr. Vol. II:Spatial Aspects of Development, 39-71.

Thwaites, A.T. (1978) *The Future of R&D Activity in the Northern Region: A Comment*. Discussion paper #12. Centre for Urban and Regional Development Studies, University of Newcastle upon Tyne, England.

Toronto Star (1979) "See how they run Quebe a year after Sun Life", January 6, 1979. 1,10.

Townroe, P. (1976) *Planning Industrial Location*, Leonard Hill. England.

Yeates, M. (1974) *An Introduction to Quantitative Analysis in Human Geography*. McGraw-Hill Inc, New York.

Vernon, R. (1966) "International investment and international trade in the product cycle", *Quarterly Journal of Economics*, 80:190-207. &bib> (1971) "International investment and international trade in the product cycle". In *The Economics of Technological Change*, edited by N. Rosenburg. Penquin Books, England. 440-460.

Walker, S. and H. Green (1981) *The Role of the Small Firm in the Process of Economic Regulation: The Evidence from Leeds*. IBG. Anglo-Canadian Symposium, Edinburgh.

Welling, S.L. (1977) *A Socio-economic Classification of Prairie Towns in 1971*. Unpublished M.A. thesis. Department of Geography, University of Calgary.

Wells, L.T. (1972) *The Product Life Cycle and International Trade*. Harvard Business School. Boston.

Wheeler, J.O. (1981) "Effects of geographical scale on location decision in manufacturing: The Atlanta example", *Economic Geography*. 57:134-145.

Whitman, E. and W. Schmidt (1966) *Plant Relocation*, American Management Association, New York.

Wilson, g. and L. Darby (1968) *Transportation on the Prairies*.

Wood, P. (1978) *Priorities in Industrial Location* Social Science Research Council, Britain. Royal Commission on Consumer Problems and Inflation. Study no.2.

Wood, P (1978) *Industrial Location* University of London.

Wright, R. (1966) *The Alberta Economy: an input-output analysis*, Report prepared for Calgary Power, Calgary.

Yeates, M. and P. Lloyd (1970) *Impact of Industrial Incentives: Southern Georgian Bay Region, Ontario*. Queen's Printer, Ottawa.

Appendix A

A. Explanations on the Statistical Methods and Computer Programmes

Michigan Interactive Data Analysis System

The Michigan Interactive Data Analysis System (MIDAS) is an interactive package which is capable of performing a variety of statistical calculations and data manipulation on a rectangular flat data matrix (Fox and Guire, 1976). Continuous interaction through a terminal is possible with MIDAS. The data input acceptable by MIDAS is arranged in the form of row vectors (for example, cases or respondents) and column vectors (for example, variables). The major convention of MIDAS is that it accepts only two variable types. The types are analytic (interval scale) and categorical (discrete or nominal). The regression analysis offered by MIDAS was employed in this study.

Regression Analysis

The data used in the regression analysis were initially modified. The dependent variables (for example, employment) were logarithmically transformed. A log transformed distribution is a distribution which is normal when transformed by using the log of the numbers in the scale instead of the numbers themselves. When y (e.g, employment) is the only transformed variable and x is not transformed, the form of the equation, expressed in linear form in natural logarithms, is

In y=In a + bx where,

In y=dependent variable (natural logarithm) In a=constant (natural logarithm)

b=intercept

x=Time (year)

The regression analysis is used to determine the changes along a sequence, that is, the general tendency of the data. To obtain this general tendency a line that minimizes the squared deviations from the general trend is estimated. The fitted line crosses the Y axis at a point (a), that is, the intercept, and has a slope (b). In order to determine the strength and direction of the relationship, the correlation coefficient (r) which indicates direction, and the coefficient of determination (r^2) which indicates the proportion of variation are calculated. The t statistic is then used to test the null hypothesis that b=0. The t statistic is the square root of the F statistic. The F statistic is given as the ratio of the regression mean square to the error mean square. All critical values of the t test are considered at the 5% probability level.

Statistical Package for the Social Sciences

The Statistical Package for the Social Sciences (SPSS) is a system of computer programmes designed to facilitate statistical analyses through the use of integrated procedures and a uniform syntax for the control language. SPSS can be employed mainly through the batch mode, that is, once the commands needed to execute a statistical analysis are submitted the analyst cannot interrupt the execution until it is completed. SPSS allows four types of commands (1) data definition (rectangular matrix or row vectors and column vectors), (2) data transformation, (3) task control, and (4) procedure (statistical). The following statistical procedures as offered by SPSS were used: Chi-square, frequency distribution, multiple response analysis, Kolmogorov-Smirnov test, Spearman rank correlation coefficient, and Kruskal-Wallis one-way analysis of variance. Explanations on each of the procedures are provided below.

(1). The Chi-Square Test

The chi-square tests essentially whether the observed frequencies in a distribution differ significantly from the frequencies which might be expected according to some assumed hypothesis (Siegel, 1956). The hypothesis under test is usually that the two groups do not differ with respect to some characteristic and, therefore, with respect to the relative frequency with which group members fall in several categories. The null hypothesis is tested by:

$$x^2=\sum_{i=1}^{r}\sum_{j+1}^{k}\frac{(Oij-Eij)}{Eij}$$

where,

Oij=observed number of cases categorized in the ith row of jth column;

Eij=number of cases expected under the null hypothesis to be categorized in the ith row of the jth column;

$\sum_{i=1}^{r} \sum_{j=1}^{k}$ sum over all (r) rows and all (k) columns, that is, to sum over all columns.

(2). The Kolmogorov-Smirnov Test

The K-S test is concerned with the degree of agreement between the distribution of observed responses and some specified theoretical distribution. In this case, the theoretical distribution is assumed to be uniform, that is, a uniform number of responses is expected on each of the rankings. The test requires logical ordering of intervals (ordinal level data). The profiles of the frequency distribution can be compared. Each frequency is expressed as a proportion of N (total number of observations). The proportions are accumulated, and the absolute values of the differences between the accumulated proportions for each row are calculated. The largest of these differences is designated D. Since the theoretical distribution of all possible D's calculated for all sample size is known, the critical limits of D at the 95 and 99 percent confidence limits can be determined (Siegel, 1956, p. 48).

(3). Multiple Response Analysis

A multiple response variable is a question that generates more than one response. The SPSS multiple response procedure allows tabulation of the responses in the order in which the responses were given. Two types of output can be achieved from the procedure, frequencies and crosstabulation.

(4). Kruskal-Wallis Analysis of Variance by Ranks

The Kruskal-Wallis (K-W) analysis of variance is used to examine whether a number of independent samples are from different populations. The test requires an ordinal level of measurement. In this study, the various development phases are compared on the basis of one variable at a time. All the cases from the various groups are ranked in a single series. The smallest score is ranked 1, and the largest ranked N, that is, the total number of independent observations in the sample. The rank sum is computed for each group. The K-W test determines whether these sums of ranks are very different, that they are not likely to come from samples drawn from the same population. To accomplish this, the H statistic (defined below) is employed.

$$H = \frac{12}{N(N+D)} \sum_{j=1}^{k} \frac{Ri2}{nj} - 3\,(N+1)$$

where,

k=number of samples

nj =number of jth sample

N= Σnj , the number of cases in all samples

combined Rj =sum of ranks of jth sample (column)

$\sum_{j=1}^{k}$ =sum over the k samples (column)

The H has approximately a chi-square distribution.

(5). The Spearman Rank Correlation Coefficient (Rs)

The Spearman Rank Correlation Coefficient is a measure of association that requires both variables to be measured in at least an ordinal scale. The observations are ranked in two ordered series. The variables (e.g., x and y) are expressed in terms of deviations. The formula for obtaining Rs.

Equation 1 $$\frac{1 - 6 \sum_{i=1}^{N} di2}{N^3 - N}$$

To obtain Rs a list of the N subjects is made. Each subject's ranks for variables x and y are noted. The difference between the two values are determined, that is, di Each di is squared and all the values of di ²s are summed:

Equation 2 $$\sum_{i-1}^{N} di2$$

Rs is obtained by entering the result of equation 2 and the value of N, that is the number of respondents into equation 1.

APPENDIX B

INTERVIEW QUESTIONS

IMPORTANT: If you are an executive of a subsidiary of a larger corporate entity, the term 'company' refers to your Division or Subsidiary only.

PART ONE

Goals

Please indicate on a scale of 1 to 5 which of the motives listed below you consider to be influential in the growth and/or the existence of your company.

	NOT IMPORTANT	1	2	3	4	5	HIGHLY IMPORTANT
1. To make a profit							
2. To provide a good product							
3. To grow							
4. To run the company							
5. To develop the company							
6. To meet or stay ahead of competition							
7. To pay dividends to the stockholders							
8. To survive							
9. To generate Research & development activities							

10. Other, please specify ______________________________

____

11. Since the establishment of this company, has your primary goal changed?

Yes ______ No ______

12. If yes, in what way? ______________________________

____

13. When did this change occur? (Please give year after the establishment of the company.)

____

____

PART TWO

Strategy for Growth

14. to 19. What sort of strategy for growth (e.g. merger, diversification*, branch plants) has your company adopted?

____

____

*Diversification refers to the creation of new products and/or processes by your company which are different enough from existing ones to imply some significant changes in your company's production or distribution program.

20. to 22. If diversification is one strategy for growth pursued by your company, what type of innovation* has your company produced?

____

____

____

*Innovation is defined as the introduction or the first commercial application of some new product, process or method, and cost-reducing organizational changes.

23. If the innovations have been adopted, what modifications have been made to the products or the processes?

____

____

____

24& 25. How were your sales distributed geographically in 1979?

____

____

26. Has your company been involved in any search activity to uncover fruitful revenue producing activities?

____

____

27. Are there any incentive schemes to encourage innovative effort?

Yes ______ No ______

28. If any, please specify ______________________________

____

____

29. Is there a formal Research and Development (R & D)* in your company?

Yes ______ No ______

*R & D comprises research aimed at developing new products, new processes, and major changes in existing products and processes. It does not include market research.

30. Is the R & D section (if any) regarded as a profit centre?

Yes ______ No ______

31. Is the R & D section (if any) part of a general marketing policy?

Yes ______ No ______

32. To what extent do your product(s) undergo changes due to technological or other changes? (Please evaluate on a scale of 1 to 5.)

INFREQUENT PRODUCT CHANGE	1	2	MODERATE PRODUCT CHANGE 3	4	5	CONTINUOUS PRODUCT CHANGE

33. To what extent do your production processes undergo changes due to technological or other changes?

INFREQUENT PROCESS CHANGE	1	2	MODERATE PROCESS CHANGE 3	4	5	CONTINUOUS PROCESS CHANGE

34. How important are product changes to your company's ultimate profitability?

NOT IMPORTANT	1	2	MODERATELY IMPORTANT 3	4	5	HIGHLY IMPORTANT

35. How important are process changes to your company's ultimate profitability?

NOT IMPORTANT	1	2	MODERATELY IMPORTANT 3	4	5	HIGHLY IMPORTANT

36. How important are organizational changes to your company's ultimate profitability?

NOT IMPORTANT	1	2	MODERATELY IMPORTANT 3	4	5	HIGHLY IMPORTANT

37. Has your company ever taken out any patents for any of your product(s) and/or process(es)?

Yes _______ No _______

Please evaluate the following:

38. Patent protection for the product's or products' features and/or manufacturing processes.

IS VERY STRONG	1	2	MODERATELY STRONG 3	4	5	DOES NOT EXIST

39. Substitute or similar product(s)/process(es) can be developed by competitors with

GREAT DIFFICULTY	1	2	MODERATE DIFFICULTY 3	4	5	EASE

40. Due to any advantages we may have in manufacturing know-how and facilities which are known to competitors, competitors (if known) will

NOT COMPETE	1	2	TRY TO COMPETE 3	4	5	IGNORE OUR ADVANTAGE

41. Would you say that the initial or any subsequent innovation was radical for your comapny?

Yes ______ No ______

42. At what management level was the decision to proceed with the innovation made (if applicable)?

____

____

43. When was the decision to innovate formalized on paper?

____

____

44. Is your product (or any of your products) being produced under license granted by another company?

Yes ______ No ______

45. If yes, please state the location (address) of the company granting the license(s).

____

____

PART THREE

Attitudes on R & D and Innovation

46. The following statements describe the role which R & D and innovation in general could play in a company's growth.

Please choose the statement which in your opinion, is most appropriate or applicable to your company (choose one).

____ Generating R & D/Innovation in the near future is necessary for my company's survival.

____ Generating R & D/Innovation is not crucial for survival, but is necessary if my company is to realize important economies of scale and thereby enhance the growth possibilities of my company in the near future.

____ Generating R & D/Innovation is not likely to contribute to any of the goals of my company in the near future.

____ Generating R & D/Innovation is likely to create more problems for my company than worthwhile results. My company is better off without R & D/Innovation.

How much do R & D activities contribute to the following aspects of your comapny's performance?

	Performance Aspects	Substantially	Moderately	Slightly	No effect	Negative effect
47.	Total Profit					
48.	Growth of Sales					
49.	Stability of Sales and Income					
50.	Reputation					

51. Other (please specify) ____________________

____

____

52. to 54. In what ways does affiliation with a parent and its manufacturing operations outside the Prairie provinces or Canada (check one) in general affect your company's R & D activities? Please check one or more as appropriate.

_____ Parent guarantees (financially) R & D activities.

_____ Parent assigns which R & D activities are to be conducted.

_____ Parent makes available its foreign R & D activities.

_____ Parent does not influence company's R & D activities.

_____ Parent discourages/does not allow (strike one) company to conduct R & D activities.

_____ Other (please specify) ____________________

____

Please state your views briefly on each of the following aspects of innovation in Canada.

56. The present state and future prospects for science-based industry.

____

____

____

____

57. The climate and opportunity for technological innovation.

58. The impediments to more effective use of science and technology in industry.

59. Suggestions for actions which could be taken by government to improve the situation.

60. The importance of organized research pools.

61. to 156. The Federal and Provincial Governments offer a number of incentive programs to promote innovation in manufacturing industries.

How would you evaluate the Federal and Provincial governments' innovation services in terms of your company's needs? Please use the following scales of 1 to 5 in making your evaluation of each program.

61. to 68. Defence Industry Productivity Program (DIP).

	1	2	3	4	5	
Broad						Narrow
Valuable						Worthless
Slow						Fast
Routine						Creative
Adequate						Inadequate
Indispensible						Superfluous
Accessible						Inaccessible
Known to Businessmen						Unknown to Businessmen

69. to 76. Industrial Research & Development Incentives Act (IRDIA) administered by the Federal Department of Industry, Trade & Commerce.

	1	2	3	4	5	
Broad						Narrow
Valuable						Worthless
Slow						Fast
Routine						Creative
Adequate						Inadequate
Indispensible						Superfluous
Accessible						Inaccessible
Known to Businessmen						Unknown to Businessmen

77. to 84. Industrial Design Assistance Program (IDAP).

	1	2	3	4	5	
Broad						Narrow
Valuable						Worthless
Slow						Fast
Routine						Creative
Adequate						Inadequate
Indispensible						Superfluous
Accessible						Inaccessible
Known to Businessmen						Unknown to Businessmen

85. Program for Advancement
to of Industrial Technology
92. (PAIT)
Plus E.D.P.

	1	2	3	4	5	
Broad						Narrow
Valuable						Worthless
Slow						Fast
Routine						Creative
Adequate						Inadequate
Indispensible						Superfluous
Accessible						Inaccessible
Known to Businessmen						Unknown to Businessmen

93. Program to Enhance
to Productivity (PEP)
100.

	1	2	3	4	5	
Broad						Narrow
Valuable						Worthless
Slow						Fast
Routine						Creative
Adequate						Inadequate
Indispensible						Superfluous
Accessible						Inaccessible
Known to Businessmen						Unknown to Businessmen

101. DREE's Nutritive Sub-
to agreement assistance
108. programs in Alberta
or
109. Small business program
to. ASCEP in Manitoba
116.

	1	2	3	4	5	
Broad						Narrow
Valuable						Worthless
Slow						Fast
Routine						Creative
Adequate						Inadequate
Indispensible						Superfluous
Accessible						Inaccessible
Known to Businessmen						Unknown to Businessmen

117.
to (a)
124. Other Provincial Program(s) (please specify)
125.
to (b)
132.

	1	2	3	4	5	
Broad						Narrow
Valuable						Worthless
Slow						Fast
Routine						Creative
Adequate						Inadequate
Indispensible						Superfluous
Accessible						Inaccessible
Known to Businessmen						Unknown to Businessmen

133. Regional Development
to Incentives Act:
140. Administered by DREE

	1	2	3	4	5	
Broad						Narrow
Valuable						Worthless
Slow						Fast
Routine						Creative
Adequate						Inadequate
Indispensible						Superfluous
Accessible						Inaccessible
Known to Businessmen						Unknown to Businessmen

141.
to (a)
148. Other Federal Program(s) (please specify)
149.
to (b)
156.

	1	2	3	4	5	
Broad						Narrow
Valuable						Worthless
Slow						Fast
Routine						Creative
Adequate						Inadequate
Indispensible						Superfluous
Accessible						Inaccessible
Known to Businessmen						Unknown to Businessmen

157. What government grants have you applied for and received?

____

____

158. to 162. Did any government program influence any of the following aspects of your company?

(a) Strategy for growth
(b) Innovation
(c) Production process
(d) Labour
(e) Transport costs
(f) Other ______________

163. If so, in which ways? ____

____

PART FOUR - Company Structure

164-197. Please indicate with a tick in the appropriate column or columns where the following functions are normally provided.

	A	B	C	D	E
Functions	Mainly at this establishment	Mainly through the Parent Company	Mainly through branch &/or Subsidiary operations	Mainly Purchasing from other companies	None of these (Please specify)
Sales promotion activities					
Pricing policy					
Raising short period bank loans					
Investment appraisal (capital equipment)					
Final decision on budgeting targets					
Management Services					
Legal Services					
Market/territory coverage					
Executive recruitment					
Wage and salary policy					
Public relations					
General Maintenance					

	A	B	C	D	E
Functions	Mainly at this establishment	Mainly through the Parent Company	Mainly through branch &/or Subsidiary operations	Mainly Purchasing from other companies	None of these (Please specify)
Product/packaging design					
Storage/Wholesaling					
Transport of materials					
Transport of finished products					
Accounting					

198. Has your policy toward the provision of any of the above functions changed since the establishment of the company?

____

____

199. If yes, how? ____

____

PART FIVE - Constraints on Growth

The following are areas where obstacles to company growth sometimes occur. Please check off those which:

a) have been obstacles to your company's growth in the past or present

b) will become obstacles to your company's growth in the future.

	Internal Factors	Past	Present	Future
200.	Lack of borrowing powers			
201.	Lack of plant and equipment			
202.	Lack of labour supply in general			
203. 204.	Lack of labour with specific skills/ if so what occupations ____________			
205.	Lack of labour stability, i.e. too much turnover			
206.	Too much competition for labour			
207.	Too high labour costs			
208.	Product problems and weaknesses			
209.	Lack of planning and organizational ability			
210.	Unwillingness to take risks			
211.	Lack of a control system related to appraisal of investment of decentralized operations			
212.	Lack of budgetary control ability			
213.	High transport costs			
214.	Personal reasons			
215.	Other			

	External Factors	Past	Present	Future
216.	Unfavorable economic and political conditions in this province			
217.	Too high company taxes			
218.	Too much uncertainty re: government policy			
219.	No sufficient government assistance			
220.	Too much government interference			
221.	Too high land and other capital costs in this province			
222.	Lack of market growth			
223.	Labour shortages in this province			
224.	Technological obsolescence of product			
225.	Lack of access to financial resources			
226.	Lack of access to management resources			
227.	Lack of domestic markets necessary to support a large diversified corporation			
228.	Appearance of a new competitor in the market territory previously served by or controlled by this company			
229.	Other (Please specify)			

230. If any of these obstacles become so burdensome to your company, would you

_____ Sell it

_____ Close it

_____ Relocate

_____ Expand

_____ Transfer it to a family member

_____ Other

PART SIX - Location Decisions

Please indicate on a scale of 1 to 5 which of the following factors were responsible for the initial location of the company.

INITIAL LOCATION FACTORS	NOT IMPORTANT			MODERATELY IMPORTANT			HIGHLY IMPORTANT
		1	2	3	4	5	
231. Personal reasons: Founder lived and worked here; chance							
232. Proximity to parent company							
233. Presence of other established companies in the same product lines							
234. Favorable economic climate for growth							
235. Expanding provincial market							
236. Available resources & raw materials							
237. Available labour							
238. Available transport							
239. Available plant site							
240. Available professional services							
241. Opportunity for R & D in a new market area							
242. Available government incentives							
243. Other (please specify)							

244. Of the above factors which, if any, was the key factors which finally influenced the company to locate here?

____

PLEASE NOTE: The following questions are only to be answered if you have been involved in any of the locational activities.

Complete Transfer or Relocation

If your company has changed its location, please state the different locations at which your company has been located in the space provided below.

LOCATION	ORIGINAL LOCATION	2ND LOCATION	3RD LOCATION
245. City			
246. Province/State			
247. Year relocated			

Please indicate on a scale of 1 to 5 the factors which have influenced your decision.

FACTORS	NOT IMPORTANT	1	2	MODERATELY IMPORTANT 3	4	5	HIGHLY IMPORTANT
248. Lower rents and rates							
249. Lower wage rates							
250. Less labour turnover/less competition for labour							
251. Release of capital from sale of existing site							
252. More efficient building							
253. Reduced traffic congestion							
254. Benefits of government incentives							
255. Proximity of new market and/or key supply							
256. Managerial enthusiasm							
257. Learning from previous errors in the planning of the new plant							
258. Consolidation of activities on the new plant							
259. Overall effect of improved environment							
260. Other (please specify							

261. In choosing this option, did you (or parent company) consider other alternatives?

Yes ______ No ______

262. If yes, please state briefly the alternatives considered and the reasons for the rejection.

____

____

263. If no, why? ________________________________

____

Branch Plant Establishment

Please indicate on a scale of 1 to 5 the factors influential in the establishment of this branch plant.

	FACTORS	NOT IMPORTANT	1	2	MODERATELY IMPORTANT 3	4	5	HIGHLY IMPORTANT
264.	Minimize competition from other plants for the labour force							
265.	Presence of a large pool of unskilled labour							
266.	Proximity to distributors and customers							
267.	Proximity to resources and suppliers							
268.	Proximity to other plants of the company/parent company							
269.	Supplement the output capacity of existing factory							

FACTORS	NOT IMPORTANT	1	2	MODERATELY IMPORTANT 3	4	5	HIGHLY IMPORTANT
270. Take advantage of an untapped market							
271. Produce product(s) designated by parent company							
272. Take advantage of government incentives							
273. Solve a slow growth problem							
274. Operate in a less urbanized environment							
275. Other, please specify							

276. In choosing this option, did you consider other alternatives?

Yes _______ No _______

277. If yes, please state briefly the alternatives considered and the reasons for their rejection.

____

____

278. If no, why? ____

____

Merger/Acquisition

If your company has ever been involved in any merger activity, please indicate on a scale of 1 to 5, the factors which you consider to have influenced your company's decision.

FACTORS	NOT IMPORTANT	1	2	MODERATELY IMPORTANT 3	4	5	HIGHLY IMPORTANT
279. Access to new Capital							
280. Solve a slow growth problem							
281. Take advantage of a previously untapped market							
282. Take advantage of government incentives							
283. Retain market share - due to the appearance of a new competitor							
284. Achieve the objective of diversifying the company so as to spread risks and increase growth prospects							
285. Other, please specify							

286. In choosing this option, did you consider other alternatives?

Yes ______ No ______

287. If yes, please state briefly the alternatives considered and the reasons for their rejection.

____

288. If no, why? ____

Expansion in-situ (or extension on existing premises)

Please indicate on a scale of 1 to 5 the factors which prompted your company to expand in-situ.

FACTORS	NOT IMPORTANT	1	2	MODERATELY IMPORTANT 3	4	5	HIGHLY IMPORTANT
289. Lower costs in comparison to other alternatives							
290. Sufficient room on existing premises (land) - expansion planned for with the initial establishment of company							
291. Maintain contacts with customers, suppliers, purchasers etc.							
292. Available adjacent land or premises							
293. Other, please specify							

294. In choosing this option, did you consider other alternatives?

Yes _______ No _______

295. If yes, please state briefly the alternatives considered and the reasons for their rejection.

____

____

296. If no, why? ____

____

APPENDIX C
QUESTIONNAIRE

IMPORTANT: If you are an executive of a division or a subsidiary of a larger corporate entity, the term 'company' in this questionnaire refers to your division or subsidiary only.

PART ONE

Please give the name and address of your company.

____

____

____

297. Could you please indicate with a tick in the appropriate box whether your company at the above address is one of the following.

(a) Head office ______
(b) Regional head office ______
(c) Divisional head office ______
(d) Other. Specify ________________________

298. When was this company established? Year ________

299. Please give the name and address (head office) of the Parent company (if any).

____

____

____

300. When was the Parent company (if any) established? Year ________

301. What type of organization is this company? Please check one. (If 'family', please identify it as such - *)

Individual ownership ______
Partnership ______
Incorporated Company (Private) ______
Incorporated Company (Public) ______
Incorporated Co-operative ______
Unincorporated Co-operative ______
Other ______

Please name each branch* and/or subsidiary* operation (within Canada and the U.S.A.) which is directly controlled by your company. Indicate also their location, type of establishment, major functions or products, year of establishment and ownership control. The structure of a hypothetical company is given as an example below. We would be grateful if this format for the presentation of this information could be followed.

*Branch offices or plants, regional or divisional head offices, manufacturing plants, transport merchandising establishments.

	Company	Location	Branch off/plant Reg/Div Head Office Mfg. plant etc.	Major functions/ Products	Year estb/ acqui-sition	Ownership control
E.G.	The Widgets Inc.	Calgary	Branch office	Sales	1962	100%
	Wayfare Division The Widgets Inc.	Edmonton	Office & Plant	Admin. & Toys	1961	100%
	Load Safe Co. Ltd.	Winnipeg	Warehouse & Trans. Dept.	Storage & Transport	1965	50%
	Can Superior Co. Ltd.	Brandon	Plant	Tin cans	1970	60%
	302.	303. & 304.	305.	306.	307.	308.

309. Approximately how many employees (management and non-management) does your company have at present? (Please check one.)

Less than 15 ________
15-49 ________
50-99 ________
100-199 ________
200-499 ________
500-1,499 ________
more than 1,500 ________

310. How many employees (management and non-management) did your company have about 10 years ago? If your company was not in existence in 1968, give employment figures, for the company's first full (financial) year after 1968.

Less than ________
15-49 ________
50-99 ________
100-199 ________
200-499 ________
500-1,499 ________
more than 1,500 ________

311. What was your total wage/salary payments in the last financial year of the company?

$ ________________ to the nearest 000.

Please indicate with a tick in the appropriate box the annual total value of shipments of goods of own manufacture of your company.

	312. 1968 or Company's first full year	313. 1978
Less than 25,000	________	$ ______________
25,000-49,999	________	______________
50,000-99,999	________	______________
100,000-499,999	________	______________
500,000-999,999	________	______________
1,000,000-4,999,999	________	______________
over 5,000,000	________	______________

314. To which census manufacturing industry (which accounts for most of your production) does your company belong? (A list of the standard Industrial classification (SIC) is attached with this questionnaire.)

Industry ____

315. What are the main products which your company produces at present? (State product types only.) And how long have these products been on the market?

316. to
318.

Main Products

( ) ________________ ( ) ________________
( ) ________________ ( ) ________________
( ) ________________ ( ) ________________

319. Has your company had any major additions to or deletions from its present product-line since the establishment of the company?

Yes _______ No _______

320. If yes, please state the main changes briefly below.

____
____
____

PART TWO

Research & Development (R & D)

PLEASE NOTE: R & D comprises research aimed at developing new products, new processes, and major changes in existing products and processes. It does not include market research.

321. How much research and development (R & D) has your company undertaken in the last five years (or since the company started production)?

_______ No R & D was undertaken
_______ Average expenditure on R & D was roughly _______% of our sales in the past five years
_______ R & D was conducted by parent company and was not made available to us
_______ R & D was made available to us

322. Where is most of your R & D conducted?

_______ in your own facilities
_______ in a university laboratory
_______ in a government laboratory
_______ in an independent laboratory

323. In the case of R & D activities resulting in inventions, was the inventor or inventors

_______ independent inventor(s)
_______ employee(s) of your company
_______ don't know?

324. How many employees are engaged mainly on R & D? ______________

325. Of these, what proportion are qualified* scientists and engineers?

__________%

*Qualified means with a recognized university degree or technical diploma.

326. How many of your products and/or processes are the result of R & D activities conducted by your company?

(a) None
(b) ______________
(c) ______________
(d) ______________
(e) ______________
(f) ______________

327. How many of your products and/or processes are the result of R & D activities conducted by your parent company?

(a) None
(b) ______________
(c) ______________
(d) ______________
(e) ______________
(f) ______________

PART THREE

Government Programs

How often has your company used one or more of the following programs in the past five years? (Please state the number of times a year your company has taken advantage of these programs.)

328.	Defence Industry Productivity Program (DIPP)	
329.	Industrial Research and Development Incentives Act (IRDIA)	
330.	Industrial Design Assistance Program (IDAP)	
331.	Program for Advancement of Industrial Technology (PAIT)	
332.	Program to Enhance Productivity (PEP)	
333.	Regional Development Incentives (RDIA)	
334& 335.	Nutritive Processing Assistance (NPA) in Alberta - ASCEP in Manitoba	
336& 337.	Small Business Grants from a) Federal Government, b) Provincial Government	
338& 339.	Other Federal Program (Please specify)	
340& 341.	Provincial Programs (Please specify)	

Appendix D

Management Levels

# of Firms

	Owners/ Manager		President		Vice President		Manager		Controller		Total
	#	%	#	%	#	%	#	%	#	%	#
Alberta											
Calgary	6	15	16	41	16	41	1	3	-	-	39
Edmonton	6	21	8	29	7	25	6	21	1	4	28
Lethbridge	2	20	5	50	3	30	-	-	-	-	10
Red Deer	7	58	2	17	-	-	2	17	1	8	12
Saskatchewan											
Saskatoon	1	5	11	58	5	26	2	11	-	-	19
Regina	5	42	2	17	4	33	1	8	-	-	12
Prince Albert	2	25	1	13	-	-	5	62	-	-	8
Moose Jaw	1	17	3	50	-	-	2	33	-	-	6
Manitoba											
Winnipeg	18	33	13	24	15	28	7	13	1	2	54
Brandon	2	22	4	44	2	22	1	11	-	-	9
Metropolitan											
Centres	36	26	50	33	47	31	17	11	2	1	152
Regional											
Centres	14	31	15	33	5	11	10	22	1	2	45

APPENDIX E

Standard Industrial Classification

1389 Oil and gas field services
1531 Operative builders
1796 Installing building equipment
1799 Special trade contractors
2295 Coated fabrics
2329 Men's clothing
2391 Curtains
2392 House furnishings
2394 Canvas and related products
2399 Fabricated textile
2411 Logging camp contractors
2426 Hardwood
2439 Structural Wood
2448 Wood pallets
2452 Prefabricated Wood buildings
2492 Particleboard
2643 Bags
2648 Stationery products
2654 Sanitary food containers
2754 Engraving and plate printing
2842 Polishes and sanitation goods
2874 Phosphatic Fertilizers
2879 Agricultural Chemicals
2899 Chemical Preparations
3041 Rubber and Plastic Hose
3069 Paloricated Rubber Products
3079 Miscellaneous Plastic Products
3361 Aluminum Foundries
3398 Metal Heat Treating
3411 Metal Cans
3423 Hand and Edge Tools
3433 Heating Equipment
3441 Fabricated Structural Metal
3442 Metal Doors
3443 Fabricated Plate Work
3444 Sheet Metal Work
3446 Architectural Metal Work
3448 Prefabricated Metal Buildings
3449 Misc. metal work
3452 Bolts, nuts
3462 Iron and steel forgings
3465 Automotive stampings
3469 Metal stampings
3471 Plating
3479 Metal coatings
3493 Steel springs
3494 Valves and pipe fittings
3496 Misc. fabricated wire products
3498 Fabricated pipe and fittings
3499 Fabricated metal products
3511 Turbines
3519 Internal combustion engines
3523 Farm machinery

3524	Lawn and garden equipment
3531	Construction machinery
3532	Mining machinery
3533	Oil field equipment
3534	Elevators
3535	Conveyors
3536	Hoists
3537	Industrial trucks
3541	Machine tools
3544	Special dies, tools
3545	Machine tool accessories
3546	Power driven hand tools
3549	Metal working machinery
3551	Food products machinery
3554	Paper industries
3555	Printing trade machinery
3559	Special industry
3561	Pumps and pumping equipment
3563	Air and gas compressors
3564	Bowers and fans
3565	Industrial patterns
3566	Speed changers
3573	Electronic computing equipment
3574	Calculating machines
3576	Scales and balances
3579	Office machines
3585	Refrigeration equipment
3589	Service industry machinery
3599	Machinery, A.E.S.
3612	Transformers
3613	Switchgear
3622	Industrial controls
3634	Electric housewares
3643	Current-carrying wiring devices
3644	Non-current carrying wiwring devices
3646	Commercial lighting fixtures
3661	Telephone apparatus
3662	Radio and TV communication equipment
3674	Semiconductors
3679	Electronic components
3699	Electrical equipment
3711	Motor Vehicles and car bodies
3713	Truck and bus bodies
3714	Motor vehicle parts
3715	Truck trailers
3724	Aircraft engines
3728	Aircraft equipment
3732	Boat building
3792	Travel trailers
3795	Tanks and tank components
3799	Transportation equipment
3811	Engineering and scientific instruments
3823	Process control instruments
3841	Surgical and medical instruments

3949	Sporting and athletic goods
3993	Signs and advertising displays
3999	Manufacturing industries n.e.s.
5051	Metals service centres
5065	Electronic parts
5082	Construction machinery - wholesale
5083	Farm machinery - wholesale
5084	Industrial machinery - wholesale
5211	Lumber materials - wholesale
6793	Commodity traders
7372	Computer programming
7391	Research and development laboratories
7392	Management relations
7394	Equipment rental and leasing
7623	Refrigeration service
7692	Welding repair
8911	Engineering of architectural services.